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REVIEW OF THE CANADIAN FOREST PRODUCTS INDUSTRY

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REVIEW OF

THE CANADIAN

FOREST PRODUCTS INDUSTRY

Forest Products Group
Resource Industries Branch
Department of Industry, Trade and Commerce
November, 1978

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FOREWORD

This review of Canada's forest products industry was prepared by the Resource Industries Branch of the Department of Industry, Trade and Commerce with the close co-operation and assistance of industry, provinces and other federal departments whose advice and guidance are gratefully acknowledged. I should mention particularly the Forest Industries Consultative Committee which consists of forest industry executives and advises the department on specific industry concerns, and the Forest Industries Development Committee which comprises federal and provincial government representatives.

This is, I believe, the first comprehensive description and analysis of the Canadian forest products industry ever to have been published. In addition to providing a detailed examination of the different segments of the industry, the review identifies a number of key horizontal factors which have an important bearing on the sector as a whole. The significance of the sector to the economic and social well-being of Canada is well documented.

The intent is to provide a factual base to further the discussion in government and industry of alternative measures that would enhance the competitive position and growth prospects of Canada's forest products industry. Because of the lengthy period involved in preparing this review and the recent and rapid changes in general economic and market conditions worldwide, there may be some minor inconsistencies in the report (statistics used are the most up to date available at the time of writing). However, the need for access to the data, as expressed by many potential users of the report, makes it important to publish it without further delay.

Sound development of this industry, based as it is on one of Canada's great renewable resources and strong technological and marketing expertise, stands as a major challenge and concern. The industry's strengths are many and the problems it faces are serious but by no means insurmountable. The potential for continued development is substantial but will require the joint efforts of everyone concerned.

E. J. Ward
Director General
Resource Industries Branch
Department of Industry, Trade
and Commerce

INTRODUCTION

The forest products industry is one of Canada's leading industrial sectors. Total industrial output was estimated at more than \$18 billion in 1978 with about half this amount being sold in international markets. This exposure to international competition is considerably higher in the primary sectors such as lumber, pulp and newsprint.

The forest products industry is national in scope as forest related activity is widely distributed across the country. The harvesting and conversion of timber into saleable products has been a prime vehicle for opening up and developing many parts of Canada over the last hundred years and the sector continues to be a major factor in many regional economies and in the Canadian economy as a whole. Numerous communities in the outlying areas are almost totally dependent on the forest economy for their social and economic well-being. For some communities, there are virtually no other industrial options.

At the national level, the forest products sector accounts for about 14 percent of the labour force employed in Canada's manufacturing industries, 13 percent of the total value of manufacturing shipments and 17 percent of Canada's total export earnings.

The growing world demand for forest products represents a major opportunity for Canada to build on its sizeable resource and industry base but it has become increasingly evident in recent years that the competitive position of Canada's forest industries has been seriously eroded at home and abroad. Given the importance of the forest industry as a prime generator of economic activity, it follows that any impairment in the industry's viability or prospects for growth should be viewed with genuine concern.

Problems to be resolved are basically those related to rapidly increasing raw material, processing, distribution and capital costs; historically low rates of return resulting in inadequate levels of investment for capital improvements and new facilities; comparatively low productivity and structural inefficiencies in certain product sectors; and emerging timber supply constraints in some producing regions.

The forest products sector has the potential to increase its contribution to many of Canada's industrial development goals such as regional, economic and social development, creation and maintenance of satisfying jobs, improved productivity and manufacturing efficiency, further domestic processing and resource upgrading, and increased exports. However, achievement of these goals will largely depend on maintaining the industry's ability to effectively compete in world markets.

Background

This discussion paper has been prepared by the Department of Industry, Trade and Commerce in consultation with other federal departments and agencies through an ad hoc Interdepartmental Committee, with the provinces through the Federal/Provincial Forest Industries Development Committee, and with industry through the Forest Industry Consultative Committee. These consultations took place from mid-1976 to early 1978, and the Department of Industry, Trade and Commerce gratefully acknowledges assistance from these groups.

Several documents have been published as an integral part of this consultative process and relate to this review. The Sector Profile on the Canadian Forest Products Industry, released at the January 1978 meeting of federal/provincial industry ministers, summarizes and, in many ways, complements the information provided herein. Studies comparing costs of wood harvesting as well as lumber, newsprint and pulp operations in the major producing regions of North America and Scandinavia expand on the cost information provided in the review. In addition, the Forest Industry Consultative Task Force, established in early 1978 at the request of the Minister of Industry, Trade and Commerce to make specific recommendations to provincial and federal governments on forest industry development, used these various documents as background material in preparing its report, which was completed in June, 1978. This task force was one of more than 20 industry sector groups established in 1978 which involved industry, labour and government officials.

It should be pointed out that a considerable amount of analysis and discussion of factors affecting the industry's performance has preceded the current exercise. Late in 1971, a group of federal ministers met with senior executives of Canada's pulp and paper industry to examine the serious difficulties facing the industry and to discuss means of improving the industry's situation. As a result of the initial meeting, there were subsequent discussions leading to a comprehensive review by a Federal Interdepartmental Committee, chaired by the Department of Industry, Trade and Commerce, of the pulp and paper industry's long-term problems, future potential and possible actions or policy options which might improve the industry's competitive position.

During the course of this review, the provinces of Quebec and Ontario requested that the newsprint industry in those two provinces be given special attention. A tripartite committee of officials representing the three governments met with senior executives of the 17 companies producing newsprint in Ontario and Quebec to assess, among other things, a number of measures which had been proposed in various industry briefs to government to deal with the industry's problems. The findings of this tripartite committee were incorporated in the Interdepartmental Committee's final report on the Canadian pulp and paper industry which was completed in the latter part of 1973.

In addition to this report, a number of in-house and special consultant studies relating to specific areas of concern were commissioned. Some of the major ones include a comparison of the overall tax burden of the pulp and paper industry in Canada compared with our major competitors, an examination of Canada's reserve timber supply, distribution of eastern Canadian newsprint to the United States, an analysis of world fibre supplies and market trends and an assessment of the potential for newsprint expansion in the Southern United States.

Several initiatives were taken as a direct outcome of the pulp and paper review. The Federal/Provincial Forest Industries Development Committee, referred to earlier, consisting of two senior officials from each provincial government and one from each of seven federal departments, was established to facilitate and encourage a continuing dialogue and exchange of views between provinces and the federal government on matters of mutual concern. In addition, the Forest Engineering Research Institute of Canada, jointly funded by the federal government and industry, was established to carry out research in mechanized logging and transportation systems directed at reducing delivered wood costs.

Objectives

The major objective of this paper is to provide both a factual base and a framework, through a comprehensive and objective assessment of key problems and opportunities, for examining alternative measures that contribute to the sound development of Canada's forest products industry.

The various issues that emerged during this analysis span a wide range of government jurisdictions and industrial interests, each with their own set of responsibilities, objectives, policy instruments and influence over forest industry development. This widespread involvement coupled with the increasing complexity of the issues themselves emphasizes the need for a high degree of co-operation and consultation to ensure that the policies and actions taken by the different parties are supportive of each other in achieving mutually agreed on objectives.

This does not mean to imply that the priorities and policy objectives of all parties concerned are necessarily the same across the country. In fact, a recognition and understanding of regional needs and aspirations is required in the formulation and implementation of national policies for the forest products industry in view of the significant differences in resource strengths, industry characteristics, and market opportunities between provinces and regions and even between product sectors.

An attempt has been made to incorporate where possible many of the comments and suggestions received through consultation but the selection of issues and setting their priority remains a highly subjective exercise.

While there is some degree of commonality between regions, it is recognized that the significance or importance of a particular problem or opportunity identified in the report to a particular region varies widely across the country.

There remains considerable scope for action by governments and industry to improve the national and international competitiveness of the forest products industry and to more fully develop its potential contribution to the national economy and to local economies in terms of production, employment, trade and community development. It is anticipated that this document will assist both government and industry in the area of long-term planning and delineation of specific objectives, targets and options for action.

Scope and Content

The main focus of the report is on the primary sectors of the forest products industry, namely lumber, plywood and other panel products, pulp, newsprint and other paper grades.

The report begins with a presentation of the conclusions. These draw from the descriptive and analytical material included throughout the report and are presented at the beginning because of their relative importance and the paper's length. The conclusions are followed by a discussion of the significance of the forest-based industry at both the national and regional levels.

Descriptive profiles for each of the major product sectors are then presented. A considerable amount of sectoral information was included in these profiles in order to give a better understanding and appreciation of the different segments making up Canada's forest products industry which is essential for a proper assessment of the unique problems and opportunities facing each product sector. The Canadian forest industry is then placed in an international perspective with regard to fibre supplies, competition in world markets, and a general economic outlook.

The report then considers a number of horizontal factors affecting the competitive position and performance of the forest products industry such as timber supplies, industry structures, the institutional environment, trends in productivity, costs and profits, availability of manpower and capital, transportation, research and development and access to world markets. The impact of the above factors are reflected in an examination of industry prospects to 1990.

CONCLUSIONS

Canada's forest industries, which in 1978 accounted for some \$18 billion in shipments and about 300,000 jobs, is in danger of falling below the potential which past experience indicates it could achieve. Failure to respond and adjust quickly to the major changes taking place in the world's forest economy will have a direct and significant impact on regional economies and on the Canadian economy as a whole. Future rates of growth could in all likelihood be well below those experienced in previous years. To put this point in perspective, a reduction of one percent in the long-term annual growth rate will result in well over \$1 billion in lost sales annually by 1985 at current prices. National targets related to economic and social development, productivity improvement, job creation, expanded export sales and related balance of payment questions will therefore be difficult to achieve if the structural problems in the industry are not resolved. Opportunities to build on Canada's natural resource and trade advantages will be lost to other producing regions.

Some segments of the industry, particularly in the upgraded product areas such as fine papers, will find it increasingly difficult to continue operations in their present form. Assuming that the development of new capacity not only in Canada but in other major producing regions continues to be constrained, the resulting upward pressure on prices could improve the profitability of existing operations at least in the short term. There may be considerable risk, however, in relying on this direction of development in view of the accelerated modernization and rationalization programs as well as intensive forest management currently underway in Europe, the favourable economics of locating new capacity in the United States, and the concerted drive to develop the forest resources of the developing countries.

The growing world demand for forest products over the longer term, particularly in view of the possibility of a constrained world supply situation, does offer a unique opportunity for Canada to build on its sizable resource and industrial base and to maintain or improve its competitive position in world markets. This will require a well planned and co-ordinated effort at all levels of government to undertake new initiatives and make appropriate accommodations in existing government policies and programs, as well as the development of a more aggressive corporate strategy by the private sector.

For example, stepped up modernization activity, restructuring and integration on a sector-wide basis will greatly improve utilization of existing plant and equipment, reduce cost structures, and maximize resource values. The incremental capacity achieved through full modernization could be from 10 to 20 percent in the pulp and paper

industry alone. New greenfield development of pulp mills is riskier at this time but Canada, in contrast to some other industrialized countries, still has a number of suitable sites and opportunities are emerging for selected investment in this area. Timing is of critical importance in view of the number of years involved in bringing new capacity on stream to meet the market demands anticipated in the 1980's.

Closure of a number of marginal mills in single industry communities as part of necessary industry restructuring will require appropriate response by governments to deal with resulting socio-economic problems and considerable forward planning by management and labour.

Competitive Situation

The competitive strength of Canada's forest industry varies significantly by region and by product sector. For example, the lumber, plywood and pulp industries in the British Columbia Interior are modern, highly efficient and generally internationally competitive, while many of the older lumber and plywood mills on the B.C. Coast and newsprint mills in Ontario and Quebec, particularly those associated with integrated sulphite pulp operations, require substantial capital expenditures to regain their competitive position.

Major escalations in certain cost elements have eroded the basic competitive position of our major export-based commodity sectors, particularly in comparison with U.S. producers. Moreover, the more domestically oriented sectors of the Canadian forest products industry, such as plywood, particleboard and certain paper and board grades, have traditionally faced significantly higher cost structures than competitors in the United States. Although the Canadian forest industry is at a disadvantage in the labour and transportation cost categories, the major disadvantage in all forest industry sectors and in most Canadian regions when compared with those in the United States is in the area of wood costs. These represent from one-third to two-thirds of total sector costs.

The industry has fundamental strengths including experienced personnel, a strong technological base, world-scale facilities in major product areas, a developed timber resource, advanced levels of integration and established marketing organizations and distribution networks. The successful development of export markets for bulk commodity forest products has subjected the producing sectors to the discipline of international competition, thereby contributing to economies of scale and high levels of specialization.

Nonetheless, an emphasis on improving productivity and cost performance, including resolution of problems associated with manpower, labour relations and transportation, is required to offset increasing cost disadvantages throughout the industry. Development and application of new technology is essential for longer term advances in productivity both in manufacturing and harvesting operations.

The various factors that affect wood costs and that offer opportunity for improvement include: greater mechanization of logging operations, development and commercialization of new logging and transportation methods, expansion of access road networks, increased use of lower cost logging and mill residues and rationalization of existing timber limits to reduce transport cost.

Problems relating to manpower and labour relations need to be addressed on a broad front and in a variety of ways. Possible areas for initiative include: increased use of existing manpower training programs with emphasis on in-plant training; greater industrial manpower planning; improved community development in remote locations and a commitment by management and labour to improve industrial relations.

There is also considerable scope for improving the level and quality of R & D in the industry and for accelerating the commercialization stage of the R & D process. Increasing Canada's technological capabilities is an important element for achieving industrial efficiency objectives over the longer term and for developing and expanding market opportunities for domestic equipment manufacturers and engineering consulting services. In addition to general tax incentives, jointly funded research organizations such as the Forest Engineering Research Institute are excellent vehicles for raising the level and quality of R & D activity in the various product sectors.

The significance of the transportation cost element to the forest industries warrants a priority emphasis on means of increasing efficiency and reducing costs of forest product transport. Installation of new transportation infrastructures, development of new transportation technology, the identification and resolution of any anomalies in the Canadian rate structure and more formal consultative arrangements between the regulatory agencies of the United States and Canada are areas for consideration.

Variation in the rate of exchange of the Canadian dollar, particularly vis-à-vis the U.S. dollar, significantly affects sales and profits of the Canadian forest industry. The depreciation of the Canadian dollar since 1976 has provided relief from competitive pressures and has expanded the opportunity for increased investment from considerably higher cash flows. At the same time, this current advantage in world markets could be eroded over the longer term unless cost increases are rigorously controlled.

Investment

Despite the currently high level of profits, comparatively low rates of return and investment over the last decade have been one of the most serious problems facing the industry. Unsatisfactory levels of investment in previous years have contributed to relative losses in efficiency and productivity, foregone markets, and reduced rates of growth and development.

Inadequate and uncertain rates of return coupled with relatively high debt/equity ratios and strong inflationary pressures have created difficulties for many forest product companies in financing major capital expenditure programs. The significant escalation of capital costs, the size of single mill investments and attendant marketing problems in the pulp and paper industry have also retarded investment.

The rapid escalation of capital costs has created a structural shift in the return on investment process, particularly within the pulp and paper industry. With rising product prices, the older facilities, providing they are efficient, yield higher returns on their relatively lower book values than do newer, more expensive facilities. This explains the relatively low investment for new mill and major replacement facilities in recent years and the emphasis on investment for incremental expansions and upgrading the productivity of existing facilities. The benefits of upgrading are: (1) increased productivity and reduced operating and maintenance costs, and (2) new capacity increments at lower capital costs and in amounts which more reasonably correspond with increased demand.

The capital requirements for modernization can vary widely depending on the sector and the extent of the programs envisaged but in view of the age structure of many parts of the Canadian industry, they will likely be substantial. The Department of Industry, Trade and Commerce has estimated that the total cost for pulp and paper modernization and pollution abatement, which are often inseparable, will be in the order of \$3 billion. This figure does not provide for mill replacement. Substantial sums are also required for facilities to reduce outside purchases of energy.

The size of the capital expenditures needed to modernize existing facilities, to meet environmental and energy conservation targets and for new capacity requires an economic environment of vigour, confidence and stability. This will provide the framework for orderly industrial development and will facilitate the availability of sufficient capital for investment within the market system.

The problems of many of the domestically oriented sectors such as fine papers are related to scale, marketing and import penetration of Canadian markets. While some progress has been made towards more efficient industrial structures, a major program involving restructuring and rationalization on a regional and industry wide basis is urgently needed to revitalize certain of these product sectors. Many associated with the industry feel that Canada's competition policy should recognize the international nature of the forest products industry and the use of mergers, acquisitions and specialization agreements among companies to capture economies of scale, to lengthen production runs and to achieve more effective marketing arrangements, particularly in the post MTN environment.

A high proportion of the investment for modernization and restructuring clearly must come from the private sector rather than from government, and a healthy business climate is essential for this to take place. Opportunities for incremental expansion and modernization are important considerations when appraising new mill development. Some provinces have identified modernization in the pulp and paper sector as a priority.

Investment incentives through the tax system have been identified by industry as one of the most effective methods for mobilizing industry resources to deal with productivity improvement as well as the forest management, environmental, and research and development questions in the forest products industry.

The trend to invest outside of Canada, particularly to improve the industry's foreign market position, may strengthen and diversify certain Canadian firms. It is recognized, however, that a major movement of investment capital outside of the country would have unfavourable implications at this time with respect to employment, balance of payments, regional development, resource utilization and the tax base. These consequences reinforce the importance of maintaining a suitable investment climate in Canada.

Forest Management

Canada's forest resources provide the base for sound industry growth and are critical to the sector's future, but must be viewed in relation to the serious forest management problems that are emerging across the country.

High costs are associated with harvesting Canada's apparently sizable surplus timber reserve due to its remoteness, the large proportion of currently non-commercial hardwoods and the need for roads and other infrastructure. Local supplies of timber, particularly in the large diameters and the better grades, are becoming increasingly tight in many producing regions across the country.

A significant part of the more accessible forest land is inadequately stocked due to the failure of logged and burned-over land to regenerate itself properly. Vast amounts of timber are also lost through disease and insect infestation, particularly from the spruce budworm in eastern Canada.

There are also inadequacies in the information used to calculate allowable cuts. Principal deficiencies include the lack of satisfactory data on timber quality, growth and regeneration, losses due to fire, insects and disease and economic accessibility, as well as inconsistency and lack of comparability in the data across the country. Such information is essential for effective long-term planning in forest management and industrial development.

Withdrawal of prime forest land from timber production for non-consumptive uses such as recreation and for environmental preservation have further eroded the Canadian timber base. Reconciliation of these uses with those of industry may be possible through further emphasis on multiple-use policies.

The review of forest policy legislation and the changing tenure arrangements that are evolving across Canada under jurisdiction of the provinces should provide opportunities to increase the level of forest management and to support sound industrial development. The reduction of wood harvesting costs through timber allocation adjustments should also result from these policy assessments.

Increased levels of forest management and integrated utilization of the resource are required in all provinces to meet the future economic and social needs of all Canadians. This will require substantially increased levels of investment of manpower and financial resources.

Finding effective ways and means of increasing forest productivity and achieving a more complete utilization of existing fibre supplies is particularly urgent in those regions such as the Atlantic Provinces that are now facing an economic scarcity of timber. Declining timber quality and local wood shortages are also becoming increasingly apparent in the southern and developed parts of British Columbia, Ontario and Quebec.

Opening up and developing the more remote and lower quality timber stands in the northern areas will necessarily involve high costs for basic infrastructure and processing, but this remains an option for extending timber supplies in Canada and for achieving regional economic and social development objectives.

Market Access and Export Promotion

Real and secure access to foreign markets is an important objective for the forest products industry. Achievement of this goal would expand and diversify the market opportunities open to Canadian producers and would facilitate resource upgrading in Canada.

While there is virtually free trade in pulp, newsprint and lumber in North America, there are varying degrees of tariff and non-tariff protection for these products in offshore markets. Removal of these trade impediments and reciprocal tariff reductions for other products that have export potential, such as bulk packaging grades of paper and paperboard, could result in increased market penetration provided Canada's competitive position in these products is strengthened. Reductions in the Canadian tariffs for some of the more domestically oriented products, such as fine papers and manufactured wood products, may require restructuring of the affected industry sector along with an assessment of the need for assistance to adjust to a more competitive environment.

Market development programs, involving both industry and government, are particularly appropriate for improving market access and increasing exports to offshore markets. Further co-operative marketing arrangements between companies to capture economies of scale in transportation and distribution will improve the competition of Canadian producers in offshore markets. Emphasis on offshore markets will continue to focus on the international opportunities for intercorporate links, improved contractual supply arrangements, technology exchanges and flow of industry and market intelligence.

Regional Considerations

Consultative Mechanisms -- Priorities and factors affecting industrial development vary significantly between regions. The forest industry, with its unique characteristics, offers perhaps the best vehicle for achievement of regional objectives.

The forest products industry is highly exposed to government policy at all levels. Provincial policies related to resource pricing, fibre allocation and forest management have a major impact on the pattern of industrial development. At the federal level, government policies and regulations in such areas as the environment, taxation, social assistance, regional development, trade, competition, transportation and the general fiscal and monetary environment are of critical importance to sector performance.

The involvement of a number of different government jurisdictions and industrial interests in matters affecting forest industry development result in a need for a high degree of co-operation and consultation.

There are formal consultative mechanisms in place between provinces and appropriate federal departments to deal with forest industry development. Two committees enable consultation between governments in the forest products sector. The Federal/Provincial Forest Industry Development Committee (FIDC) is chaired by the Department of Industry, Trade and Commerce and composed of two senior officials from the industry and forestry departments of each province and one senior official from seven federal departments. Established in 1974, the Committee's purpose is to facilitate and encourage an exchange of views between provinces and the federal government on forest industry matters. The Federal/Provincial Council of Resource and Environment Ministers (CCREM) involves all provinces and the Federal Department of Environment and is examining the feasibility of a national forest policy. These committees provide a focus for ensuring effective consultation between governments on a continuing basis.

Modernization and Restructuring -- Expenditures on modernization to improve productivity in the pulp and paper industry will have their greatest impact in Ontario and Quebec because of the concentration of industrial production in these provinces and the high proportion of older plant and equipment relative to other regions. It should be emphasized, however, that certain mills in other parts of Canada also require immediate attention in order to remain economically viable over the longer term. It is recognized that an increasing proportion of capital expenditures have already been directed towards this area.

In the wood products industries, emphasis on modernization would benefit all provinces but would be particularly applicable on the B.C. coast where many of the older lumber and plywood mills are finding it increasingly difficult to adjust to the declining quality and size of available timber supplies. Modernization of production facilities in eastern Canada may have to be accompanied by major rationalization and restructuring programs involving all industry segments. A pilot study, under the aegis of FIDC, was undertaken in New Brunswick to better define the problems that might be met in such a rationalization program.

Forest Management -- There is widespread consensus on the need for substantially increased investment in the forest resource in all provinces, but particularly in areas facing diminishing timber supplies. Most of the policy objectives, forestry issues, and major resource problems outlined in this report are common in all provinces, at least to some degree.

Industrial expansion and community development will continue to be emphasized in the northern and more remote regions of the provinces. Attention is being increasingly focused on small scale operations based on purely local conditions to provide the economic base for achieving social and economic development objectives, particularly in Manitoba and the Atlantic Provinces. Greater commercialization of the abundant supplies of low grade hardwoods continues to have high priority, especially in the Prairie Provinces and Eastern Canada.

Trade and Market Development -- Given the importance of the U.S. market to all producing regions in Canada, maintaining or improving the Canadian presence in the U.S. is considered essential. In terms of regional effect, efforts to improve market access and increase the level of offshore demand for Canadian forest products would primarily benefit B.C. producers and mills in Eastern Canada with access to tidewater. Companies that have limited opportunities in overseas markets due to transportation costs would also benefit, at least to the extent that increased offshore shipments from B.C. and Eastern Canada would result in a more reasonable supply/demand balance in the prime North American market.

SIGNIFICANCE OF THE SECTOR

National

The forest industry has a long and significant history in Canada, having played a pioneering role in opening up many parts of the country. Utilization of the timber resource was frequently the vehicle used to push back the physical frontier, at the same time making available a substantial share of capital to advance the economic frontier. This is in contrast to other manufacturing and secondary activity which followed the forest industry, sometimes by several decades.

The forest products industry remains one of Canada's leading industrial sectors in terms of sales, employment, export earnings and regional dispersion. Moreover, it is the economic mainstay of numerous single-industry communities located throughout the country. The sector is unique in that it is based on a substantial renewable resource, which in addition to providing the long-term raw material requirements of the various wood-using industries, confers significant social and environmental benefits to the country as a whole.

Nearly 300,000 employees were on the payrolls of forest industry firms in 1976. Of this number, 20 percent were employed directly in logging and 80 percent in manufacturing. Fourteen percent of Canada's manufacturing employment is in forest products.

The industry also supports a great deal of employment indirectly, as a result of backward and forward linkages provided by major purchases of goods and services from other industries, and through the spending of incomes received by employees in the forest industry. While the full impact of these linkages is difficult to measure, employment multipliers for this industry have been estimated to range between two and three, which means that the initial 300,000 forest industry employees are associated with a minimum of 300,000 other workers in the local community and up to 300,000 additional workers elsewhere in the Canadian economy. The number of jobs directly or indirectly supported by the forest industry is close to one million which is equivalent to about 10 percent of the Canadian work force.

In 1976, the value of total shipments of manufactured forest products was \$13.2 billion, of which about half was exported. With imports of less than \$1 billion, the annual net export surplus was about \$5.5 billion, which is slightly less than the trade deficit in petroleum currently being projected for 1985.

Also of interest is the fact that forest products account for about 14 percent of total value added in manufacturing in Canada. This is shown with other statistical measures in Table 1 and the chart.

TABLE 1

Selected Forest Industry Statistics for Canada, 1976

| | <u>Logging</u> | <u>Wood Industries Group</u> | <u>Paper, Pulp and Allied Industries</u> | <u>Total Forest Industry Manufacturing</u> | <u>Percent of Total Manufacturing</u> |
|--------------------|----------------|------------------------------|--|--|---------------------------------------|
| Number employed | 49,878 | 105,931 | 130,207 | 236,138 | 14 |
| (million dollars) | | | | | |
| Wages and salaries | 773 | 1,351 | 1,938 | 3,289 | 15 |
| Value added | 1,329 | 2,206 | 3,774 | 5,980 | 15 |
| Shipments | 3,213 | 4,995 | 8,229 | 13,224 | 13 |
| Exports | 72 | 1,916 | 4,490 | 6,406 | 31 |
| Imports | 63 | 373 | 362 | 735 | 2 |

Source: Statistics Canada

Note: Logging statistics are excluded from manufacturing total.

NATIONAL SIGNIFICANCE OF FOREST INDUSTRIES

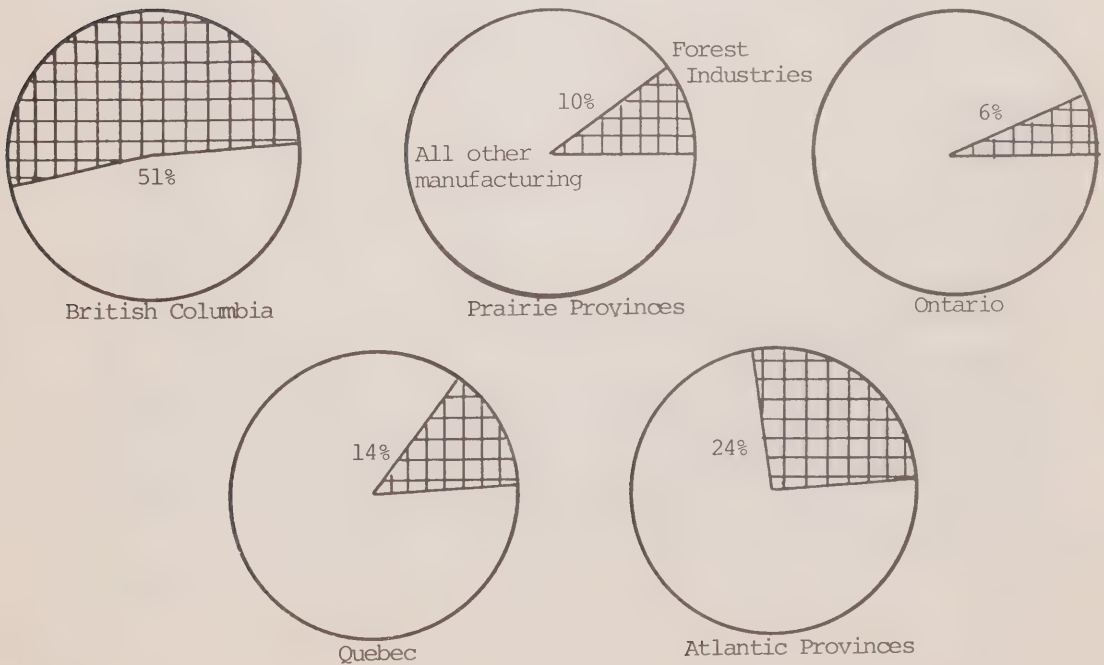
Sector as Share of Total Manufacturing 1976

Forest Industries



REGIONAL SIGNIFICANCE OF FOREST INDUSTRIES

Sector as Share of Manufacturing Shipments 1976



Regional

The contribution of the forest industry to regional economies varies widely across the country. While forest products manufacturing facilities are located in virtually all accessible forest regions in Canada, the industry is concentrated in those provinces and regions with the most abundant economic forest resources. Moreover, the product mix and characteristics of forest manufacturing activity vary from region to region and are determined in part by the nature of the resource.

Because there are advantages to be gained in locating processing mills close to the resource, the industry is very often located in areas remote from major population centres. For this reason, the sector is an important vehicle for the achievement of regional economic and social development objectives. These objectives can vary considerably between regions given the great diversity in resource values, market opportunities and alternative development options.

The regional distribution of Canada's annual allowable cut as well as each region's share of the total Canadian forest industry's value of shipments is presented in Table 2.

TABLE 2

| | (percent) | |
|------------------|--|---|
| | Softwood Annual Allowable Cut | Value of Forest Industry Shipments |
| Atlantic | 8 | 8 |
| Quebec | 20 | 25 |
| Ontario | 14 | 25 |
| Prairies | 10 | 6 |
| British Columbia | 48 | 36 |
| | <u>100</u> | <u>100</u> |

Source: FLC Reed and Associates Ltd.

As indicated in the above table, almost 50 percent of the softwood annual allowable cut is located in British Columbia. The forest industries in Central Canada and in certain parts of the Atlantic Region, however, have a generally greater proportion of industrial shipments in comparison with available resources than in either the Prairies or British Columbia, suggesting significant development opportunities for both these regions.

The forest products industry's contribution to Canada's regional economies is indicated in Table 3.

TABLE 3
Forest Products Industry as a
Percentage of Total Manufacturing, 1976

| | Atlantic Provinces | Quebec | Ontario | Prairie Provinces | British Columbia |
|-------------|-----------------------|--------|---------|----------------------|---------------------|
| Employment | 23 | 14 | 8 | 10 | 46 |
| Shipments | 24 | 14 | 6 | 9 | 51 |
| Value Added | 31 | 15 | 7 | 10 | 54 |

Source: Statistics Canada

British Columbia -- the forest industry is the dominant industrial sector accounting for almost one-half of total manufacturing activity in the province. B.C. produces about two-thirds of Canada's softwood lumber and the bulk of its softwood plywood. Its pulp and newsprint industries are relatively new, highly integrated and increasingly significant. The lumber, plywood and pulp industries have grown rapidly in the interior of the province since the early 1960s and many of the mills in this region are very efficient by world standards.

Prairie Provinces -- in these three provinces the forest products industry accounts for between 9 and 10 percent of regional manufacturing. Most of the various forest product sectors are represented in each of these provinces, and although not dominant, the industry has a significant presence.

Ontario -- the sector represents between 6 and 8 percent of total manufacturing activity. Although this share is lower than in other parts of Canada, this is more a reflection of the size of other industrial sectors than of the absolute size of Ontario's forest industry. The Ontario industry includes large and well established pulp, newsprint and other paper and board industries, and a growing lumber industry. In fact, the forest industry along with mineral processing provides virtually the sole industrial base and manufacturing presence in the northern part of the province.

Quebec -- the forest industry is one of the leading industries in terms of employment, wages, shipments and value added, representing between 14 and 15 percent of total manufacturing. All the product sectors are well represented in this province and the size of total industry production is about equal to that of Ontario. The Quebec industry produces about 60 percent of Canada's newsprint and a high proportion of Canadian fine papers. Major expansion of the sawmill industry in recent years has resulted in increased levels of integration.

Atlantic Provinces -- the forest industries, although not dominant in share of Canadian production, are a major factor in their provincial economies. The forest industry accounts for up to one-third of manufacturing throughout the region. In Newfoundland, for example, the pulp and paper industry alone is the largest contributor to manufacturing. In Nova Scotia, pulp and paper is second in shipments and first in value added, and in New Brunswick the pulp and paper sector predominates. In the Atlantic Provinces the wood product manufacturers are significant in terms of wood utilization, employment and community support.

In addition to its overall contribution to provincial and regional economies, the forest industry provides the economic base for many local communities across Canada. The Department of Regional Economic Expansion has identified about 800 of these single-industry communities, of which more than 300 are wood-based. The percentage distribution of these communities dependent on the forest industry is indicated by region below:

| | <u>Percent</u> |
|--------------------|----------------|
| Atlantic Provinces | 20 |
| Quebec | 38 |
| Ontario | 14 |
| Prairie Provinces | 5 |
| British Columbia | <u>23</u> |
| CANADA | <u>100</u> |

Source: Department of Regional Economic Expansion

Studies have been undertaken to quantify the effect of the forest industry operations on local economies. The local community multiplier varies in size according to the population and the industrial diversity of the area concerned. Generally, larger centres have higher employment multipliers since they support a larger and more diversified industrial base. In addition, a community with a significant forest or other basic industry may develop into an important regional centre for supply, distribution and service functions for surrounding communities. Examples include Prince George in British Columbia and La Tuque in Quebec. While in the smaller and more isolated communities, the multipliers are lower because goods and services must be obtained elsewhere, the community's dependence on the basic industry is often just as significant.

The following estimated community employment multipliers are from studies published by the forest services in Quebec, Ontario and British Columbia, and include only employment directly affected by the industry: Quebec -- Gatineau 2.25, Kénogami 2.02, La Tuque 2.29; Ontario -- Dryden 2.01, Hearst-Kapuskasing 2.13; British Columbia -- Prince George 2.43, Okanagan 2.49.

On the basis of these estimates, the minimum local multiplier is estimated at 2; that is, for every employee in the forest industry, there is at least one employee in another activity directly and locally dependent on the forest industry.

SECTOR PROFILES

PRIMARY WOOD PRODUCTS

The primary wood product manufacturers include establishments essentially engaged in the conversion of roundwood (logs) by mechanical means (sawing, peeling, slicing, chipping, milling) into lumber, wood chips and other residual by-products, veneer, plywood, particleboard, other wood-based panels and a range of minor wood products.

In 1976, the total value of shipments of the major primary wood product items amounted to \$3.3 billion. Approximately 76,000 workers are employed in this sector with a total payroll of about \$1 billion in 1976. Lumber is the largest single product produced in this group with annual sales in excess of \$2 billion.

The importance of the various products as measured by value of shipments in this sector is indicated in Table 4.

TABLE 4

Industry Shipments of the Major Primary Wood Product Items, 1976

| | <u>\$ Million</u> | <u>Percent</u> |
|---------------------|-------------------|----------------|
| Softwood lumber | 2,134 | 64 |
| Pulp chips | 456 | 14 |
| Softwood plywood | 364 | 11 |
| Shingles and shakes | 97 | 3 |
| Particleboard | 77 | 2 |
| Hardwood lumber | 69 | 2 |
| Hardwood plywood | 59 | 2 |
| Hardwood veneer | 43 | 1 |
| Softwood veneer | <u>43</u> | <u>1</u> |
| TOTAL | 3,342 | 100 |

Source: Statistics Canada.

LUMBER

Key Points

- The lumber industry is a major user of Canada's forest resources, accounting for about 45 percent of the total timber harvest. Moreover, the pulp chips and other residual by-products of lumber manufacture are an increasingly important source of raw material for other wood-using industries.
- Pulp chip sales, which can represent between 20 and 30 percent of total mill shipments, have become a prime requisite for supporting profitable sawmill operations.
- The growing imbalance between pulp chip production and domestic consumption has become a major problem, particularly in British Columbia and parts of Quebec.
- The number of operating sawmills has declined steadily during the past decade reflecting the trend towards larger, more centralized and, in many cases, integrated operations.
- Canada continues to be in the forefront of the development and application of new processing technology. The most significant technological change in the softwood lumber industry has been the development of high volume, small log processing systems.
- Domestic machinery producers have benefited from increased domestic and export sales of equipment developed for the harvesting and processing operations of the Canadian industry.
- Despite recent escalations in wood and operating costs, Canada's softwood lumber industry has reached productivity levels that are generally competitive with other major producing countries.
- Lumber generally has a minimum degree of tariff protection in world markets and about two-thirds of Canadian softwood lumber production is exported, mainly to the United States followed by the EEC, Japan and other offshore markets.
- Canada has a significant transportation cost disadvantage compared with other major suppliers in most offshore markets. Furthermore, non-tariff measures such as building codes and product standards represent a further constraint to full market penetration offshore.
- The North American lumber market is fully competitive and the lumber industry is highly sensitive to changes in overall economic conditions and to building cycles in particular. Production and price levels respond quickly to fluctuations in supply and demand.

- . Softwood lumber production increased rapidly during the early 1970's to 14.9 million board feet in 1973 in response to an unprecedented world demand for softwood lumber. Production dropped off sharply in 1974 and 1975 but has since entered a strong recovery phase reaching a new record high of 17.3 billion board feet in 1977. Market conditions were equally strong in 1978 but the overcapacity in the narrower widths and shorter lengths is a recurring problem, particularly in Central and Eastern Canada.
- . Production of hardwood lumber has been essentially static during the past decade and Canada has been a net importer since 1972.
- . Declining log quality and diminishing supplies of preferred hardwood species is a major constraint for the hardwood lumber industry. The future viability of the hardwood lumber industry will largely depend on increased integration with other wood using industries and improved market opportunities for lower grade hardwoods.

Lumber is one of the major products of Canada's forest industry. Manufacturing facilities are located in virtually all accessible forest areas of Canada and process about 45 percent of Canada's total timber harvest. Moreover, the lumber industry provides about 40 percent of the total fibre requirements of the pulp and paper industry in the form of wood residues that are a by-product of lumber manufacture.

The general operating characteristics, industrial organization and market opportunities of the lumber industry are highly regionalized and vary widely within and among the different forest regions. The softwood component of the lumber industry accounts for about 96 percent of the lumber produced in Canada.

Softwood Lumber

The Canadian softwood lumber industry consists of about 1,000 manufacturing facilities with the total value of softwood lumber shipments amounting to \$2.1 billion in 1976, about 60 percent of which is exported. Pulp chips provided the industry with about \$400 million in additional revenues in 1976.

Canadian production of softwood lumber increased from 9.4 billion board feet in 1963 to 14.9 billion board feet in 1973, an increase of 59 percent with most of the new capacity coming on stream since 1970. Production and price levels declined sharply in 1974 and 1975 as a result of severely depressed economic conditions in virtually all major markets but the Canadian lumber industry has since entered a strong recovery phase in line with increased construction activity, particularly in the United States. Production for 1977 is estimated at a new record high of 17.3 billion board feet with further growth prospects anticipated for 1978.

TABLE 5

Canadian Softwood Lumber Production Exports, Imports and Apparent Consumption, 1963 - 1977

(million board feet)

| | <u>Production</u> | <u>Exports</u> | <u>Imports</u> | <u>Apparent Consumption</u> |
|------|-------------------|----------------|----------------|---------------------------------|
| 1963 | 9,410 | 6,095 | 129 | 3,444 |
| 1968 | 10,762 | 7,040 | 198 | 3,920 |
| 1973 | 14,940 | 6,703 | 298 | 5,415 |
| 1974 | 13,001 | 8,167 | 319 | 5,153 |
| 1975 | 11,150 | 6,484 | 363 | 5,029 |
| 1976 | 14,886 | 9,580 | 397 | 5,817 |
| 1977 | 17,279 | 12,211 | 324 | 5,392 |

Regional Production -- The rapid growth in sawmill capacity during the 1970's can largely be attributed to increased penetration of Canadian lumber in the United States market, pressure from provincial governments on timber limit holders to more fully utilize their allowable cut, considerable government assistance with capital funding as part of regional development programs and improved rationalization and integration with other forest products manufacturers.

While all provinces except the Atlantic Region have experienced a significant expansion in the sawmill sector, there has been a notable shift in the regional shares of production. The B.C. Interior accounted for about one-half of the total increase in Canadian lumber production between 1963 and 1977. Output in Ontario and Quebec has more than doubled over the same time period and these provinces combined now account for about 22 percent of total Canadian production. These provinces, together with Alberta, are expected to continue to experience significant increases in softwood lumber production during the next few years as a number of new sawmills reach full productive capacity. However, the growth prospects for the Canadian industry as a whole during the 1980's will likely be significantly below the high rates evident in the 1970's as incremental supplies will be increasingly limited to the more northern and remote regions of the country.

TABLE 6

Regional Production of Softwood Lumber, 1963-77

| | 1963 | | 1977 | |
|--------------------|------------------------|----------------|------------------------|----------------|
| | <u>Million Bd. Ft.</u> | <u>Percent</u> | <u>Million Bd. Ft.</u> | <u>Percent</u> |
| B.C. Coast | 3,993 | 36 | 4,497 | 26 |
| B.C. Interior | 3,337 | 35 | 7,533 | 44 |
| Prairies | 506 | 5 | 936 | 5 |
| Ontario | 555 | 6 | 1,217 | 7 |
| Quebec | 1,083 | 12 | 2,600 | 15 |
| Atlantic Provinces | <u>535</u> | <u>6</u> | <u>496*</u> | <u>3</u> |
| CANADA | 9,410 | 100 | 17,279 | 100 |

Source: Statistics Canada.

* Production in Newfoundland estimated at 30 million board feet.

Industry Structure -- The number of operating sawmills has declined about 50 percent since 1963 as numerous small mills that were established in earlier days to produce low grade lumber for local consumption or for further processing have either merged with other sawmills or have ceased operations altogether. The trend, particularly in the B.C. Interior and Central Canada, has been toward construction of larger, more centralized operations in areas with adequate transportation facilities and established infrastructure. Major contributing factors have been the dwindling resource base of many small mills, integration of sawmills with other wood-using industries and the increasing necessity for industry to provide a minimum level of economic and social services to workers in order to secure and maintain a stable work force.

As a result, the share of total industry shipments by sawmills with less than 50 employees has declined from 35 percent in 1963 to 12 percent in 1976. Although the importance of small mills in terms of national production is diminishing, these mills are still an important source of income and employment in many local economies and provide the economic base for achieving regional industrial and community development programs across the country.

TABLE 7

Value of Shipments of Sawmills by Size Group, 1963-76

| Size Group (Employees) | 1963 | | 1976 | |
|---------------------------|------------|---------|------------|---------|
| | \$ Million | Percent | \$ Million | Percent |
| Under 50 | 270 | 35 | 340 | 12 |
| 50 - 100 | 146 | 19 | 344 | 12 |
| 100 - 199 | 130 | 17 | 893 | 31 |
| 200 - 499 | 124 | 16 | 886 | 31 |
| Over 500 | 106 | 14 | 416 | 14 |
| ALL SAWMILLS | 776 | 100 | 2,879 | 100 |

Source: Statistics Canada.

Scale of Operations -- Sawmills range in size from small, part-time operations producing under one million board feet per year to large, highly mechanized units with annual capacities of 200 million feet or more. Scale of operations and type of processing facilities used are normally determined by the quantity, species, size and quality of available timber supplies, intended end-use of the product produced, and market opportunities. These factors vary considerably across the country.

Although economies of scale in sawmilling are not as apparent and as well defined as in other product sectors such as pulp, it is evident that Canada's lumber industry has become significantly more capital-intensive. Major emphasis has been placed on increased productivity through automation of production processes to reduce labour content, optimize yields and increase quality control and on installation of facilities for product upgrade and recovery of residual by-products. This has required greater capital outlays for initial log processing, transformation to lumber, dry kilns, sorting, unitizing and dressing facilities, and complementary infrastructure. New environmental standards have also had an impact on capital requirements. In order to reduce capital costs per unit of production and to effectively compete in export markets, the minimum size of a new dimension mill producing a narrow range of construction grade lumber is considered to be in the order of 30 to 60 million board feet annual capacity in the major producing regions. It is important to note, however, that the annual capacity of many of the existing mills in Canada, especially in the Atlantic Provinces is considerably below the minimum size referred to above but these smaller mills are still viable operations. Small mills as a general rule can effectively compete with the large primary producers by concentrating on specialty items, satisfying local market demand or by utilizing stands of timber that would not support large-scale logging operations.

Technology -- The most significant technological change in the industry over the past decade has been the development and wide-scale usage of small log processing systems.

During the 1960's, in an effort to reduce unit logging costs and to comply with the application of more stringent utilization standards on Crown land, the industry in the B.C. Interior and Central Canada converted extensively to more intensive harvesting methods such as tree length logging which resulted in large volumes of small size material at the sawmill site. At the same time, new sawmilling technology including profile chipping machines, high strain band mills and thin kerf circular saw equipment was being developed with the capability of processing small diameter logs at high linear feed rates. Attention was then focused on the development of total systems designed for small log processing. These systems have greatly lowered the minimum size of timber that can be economically processed into lumber and has allowed industrial expansion to take place in the more northern and marginal timber areas. In addition, the industry witnessed the establishment of a more fully integrated lumber and pulp industry as high volume sawmills were designed to increase chip output per unit of lumber produced.

One of the major downstream benefits associated with these technological advances in harvesting and sawmilling has been the dramatic expansion of market opportunities for domestic equipment manufacturers both in Canada and abroad.

Residual By-Products -- The sale of pulp chips derived from the solid woodwaste generated in lumber manufacturing can represent between 20 and 30 percent of mill revenue and has become a prime requisite for supporting profitable sawmill operations. Sawmills that do not have access to suitable market outlets for pulp chips either because of mill location or other constraints are at a significant competitive disadvantage to integrated mills. Moreover, the growing reliance of the sawmill industry on pulp chip revenues coupled with the increasing dependence of the pulp industry on pulp chips as a source of raw material points to the need for a better harmonization of pulp chip production and utilization between the two sectors over the business cycle.

The oversupply of pulp chips in British Columbia and parts of Quebec in the mid-1970's is a case in point. There is a definite need to develop export markets for chips that do become surplus as the supply/demand balance for domestic processing changes from time to time. The industry is actively seeking new export business in Europe and Japan but the lack of adequate handling and loading facilities for chips, high transportation costs and periods of weak demand in world pulp and paper markets represent major constraints to the development of significant volume markets.

Lumber Grade Mix -- Lumber is manufactured in a great number of different grade and size specifications for a wide variety of structural and non-structural end-use applications.

Grades of lumber are basically determined by the inherent physical properties of the individual species of wood and by the degree of distribution of both natural defects such as knots and pitchpockets and defects incidental to manufacture such as torn grain, warping, wane and stain. Consequently, the range of products produced by a particular mill is restricted by the species, size and quality of log inputs. Sawmills have, however, undertaken measures to limit the amount of degrade from factors under their control. Increasing emphasis has been placed on greater accuracy in sawing and on improvements in product protection and presentation such as strapping, packaging, bundling and end-coating.

The most notable trend in terms of grade mix over the last decade has been the relative decline in the production of shop and clear grades of lumber and the corresponding increase in the production of construction grades. This is largely the result of the declining availability of and increased competition for logs of sufficient size and quality to manufacture the higher grades and increased production in the B.C. Interior and Central Canada where, because of the nature of the resource, production is confined for the most part to construction grades of lumber.

Shop and clear grades account for less than 5 percent of total softwood lumber production and this proportion is expected to continue to decline in the future. Production of these grades is confined mainly to British Columbia, and in particular the Coastal region because of the relatively larger diameter logs and unique species mix found in this forest region and to a much lesser extent to the white pine resource in Eastern Canada.

The most significant increase has been in the construction grade dimension lumber (nominal 2") category which now accounts for more than 80 percent of total softwood lumber production. This proportion is expected to increase as the industry continues to expand in central Canada, in the northern and interior regions of British Columbia and in Alberta. Because of the widespread use of small-log conversion plants in these regions, most of this anticipated growth will be heavily concentrated in the narrower widths and shorter lengths and will not necessarily be in balance with future market requirements. The industry is currently examining manufacturing techniques such as end and edge jointing of lumber and reconstituted wood products in order to manufacture a wider range of grades and sizes.

Construction grade boards (nominal 1") and timbers (over 4") account for the remaining 15 percent of total softwood lumber production and this proportion is expected to continue to decline in the future.

Concentration of Production -- Despite the well established trend towards mergers, consolidations, and establishment of larger production units, the softwood lumber industry in Canada is still characterized by a high degree of fragmentation, particularly in comparison to other industrial sectors. According to the annual survey of lumber producers published by Miller Freeman Publications Inc., the largest lumber producer in Canada with seven mills accounted for only 8 percent of total softwood lumber production in 1973. Moreover, the top five companies accounted for 23 percent of total production, the top 10 for 34 percent and the top 15 for 41 percent. The remaining 59 percent of total production was distributed among more than 1,000 other producers.

It is worth noting that most of the top 15 lumber producers in Canada are large, fully diversified forest products companies whose base of operations is located in British Columbia. However, many eastern pulp and paper companies have greatly expanded their sawmilling capability either through installation of new facilities or acquisitions and are now major lumber producers. This could have an impact on existing industry practices in eastern Canada as the eastern lumber industry has traditionally operated independently of the pulp and paper sector.

Markets -- The industry is highly export oriented with about two-thirds of domestic production sold in export markets. Canada produces only about 10 percent of the world output of softwood lumber but accounts for almost 40 percent of total international trade. Only the Scandinavian countries are as dependent as Canada on export sales for their livelihood. The major deficit regions in the world for softwood lumber are the EEC and the United States.

TABLE 8
World Production, Consumption and Trade
in Softwood Lumber, 1976

(million board feet)

| | <u>Production</u> | <u>Imports</u> | <u>Exports</u> | <u>Apparent Consumption</u> |
|---------------|-------------------|----------------|----------------|---------------------------------|
| Canada | 14,877 | 397 | 9,582 | 5,692 |
| United States | 30,840 | 7,505 | 1,574 | 36,771 |
| U.S.S.R. | 42,797 | 36 | 3,623 | 39,210 |
| Japan | 12,139 | 1,277 | - | 13,416 |
| Scandinavia* | 8,146 | 173 | 4,608 | 3,711 |
| EEC** | 6,730 | 9,349 | 468 | 15,611 |
| Other | <u>23,608</u> | <u>3,991</u> | <u>4,013</u> | <u>23,586</u> |
| WORLD TOTAL | 139,137 | 22,728 | 23,868 | 137,997 |

Source: Food and Agricultural Organization, 1976 Yearbook.

* Norway, Finland and Sweden.

** Nine member countries.

The U.S. accounts for more than 80 percent of Canada's total softwood lumber exports because of proximity and ease of market access. There are no tariffs on basic lumber items traded between Canada and the United States, customs documentation is minimal and lumber grades, sizes and grading procedures have been standardized throughout North America.

Other major markets are the EEC and Japan with the remainder being distributed among 45 other countries. Canada faces strong competition from Scandinavian, the U.S.S.R. and East European producers in European and other offshore markets because of proximity and other economic advantages of these countries. However, the growing fibre deficit in Europe and some countries in Southeast Asia coupled with progress towards an international harmonization of lumber grades and standards should enable Canadian producers to continue to take advantage of emerging opportunities in offshore markets.

TABLE 9

Canadian Production and Exports of Softwood Lumber

(Million Board Feet)

| <u>Year</u> | <u>Production</u> | <u>Exports</u> | | | | | |
|-------------|-------------------|----------------|----------------------|----------------|------------------|--------------|--------------|
| | | <u>Total</u> | <u>United States</u> | <u>Britain</u> | <u>Other EEC</u> | <u>Japan</u> | <u>Other</u> |
| 1963 | 9,410 | 6,095 | 4,628 | 692 | 140 | 291 | 344 |
| 1968 | 10,762 | 7,040 | 5,423 | 580 | 168 | 541 | 328 |
| 1973 | 14,940 | 9,823 | 8,189 | 533 | 163 | 617 | 321 |
| 1974 | 13,001 | 8,167 | 6,398 | 635 | 194 | 501 | 439 |
| 1975 | 11,000 | 6,484 | 5,451 | 265 | 106 | 408 | 254 |
| 1976 | 14,886 | 9,580 | 7,752 | 594 | 299 | 634 | 301 |
| 1977 | 17,279 | 12,211 | 10,339 | 573 | 276 | 706 | 316 |

Source: Statistics Canada.

U.S. Markets -- The United States has become increasingly dependent on imports for its domestic softwood lumber requirements. Canada supplies nearly all of the U.S. imports of softwood lumber and accounted for about 28 percent of U.S. consumption in 1978.

Over three-quarters of Canadian exports to the U.S. originate in British Columbia. Because transportation costs represent a significant portion of delivered lumber values, marketing of lumber in North America is highly regionalized. In general, the bulk of exports to the U.S. from the B.C. Coast consist of waterborne shipments to the U.S. Atlantic Coast; exports from the B.C. interior are delivered mainly by rail to destinations in the Midwestern and Northeastern U.S. The B.C. Coast industry has developed a highly efficient system for handling waterborne shipments. In addition, by using foreign flag vessels not available to the U.S. producers because of the Jones Act, the B.C. industry generally enjoys lower freight rates to the U.S. Atlantic Coast than its counterparts on the U.S. West Coast. Similarly, rail rates from B.C. to eastern U.S. markets are generally competitive with rates from the western United States. Exports to the U.S. from Eastern Canada are mainly rail and truck shipments to adjacent states.

The Western States, particularly Washington, Oregon and California account for the bulk of U.S. production. Production in this region has remained relatively static since the 1950's and because of diminishing supplies of sawtimber, will likely decline in the future. In contrast, softwood lumber production in the southern United States has increased steadily since 1961 and now accounts for about 25 percent of total U.S. production. Although most of this production is

consumed directly in the Southern States, Canadian producers have experienced some competitive pressures from the U.S. South in traditional Eastern U.S. markets, particularly during the recent downturn. The favourable timber supply situation in the U.S. South suggests potential for further growth in southern pine lumber production but this increase will be offset by a decline in production anticipated in the U.S. Pacific Northwest. Moreover, competition for available fibre from other product sectors is expected to intensify in the U.S. South during the coming years which will put an upward pressure on the stumpage rates paid by the lumber industry.

The bulk of lumber produced in Canada and the United States is marketed through numerous independent wholesalers and retailers, although producer-owned distribution outlets are growing in importance. Since softwood lumber is usually traded in carload or truckload quantities, the market is open to almost any producer regardless of size. The marketing of waterborne shipments, however, is much more concentrated, reflecting the need for assembly of large volume shipments and highly sophisticated transportation and distribution systems. For example, over 90 percent of the waterborne shipments from the B.C. Coast is handled by four companies.

Residential construction is the largest single end-use market for softwood lumber although non-residential markets such as industrial applications have experienced rapid growth in recent years. Given the fragmented and competitive nature of the lumber industry in North America, production and prices of softwood lumber respond quickly to changes in overall economic conditions and to construction activity in particular. Consequently, the softwood lumber industry has a history of wide and frequent price fluctuations over the business cycle. The traditional dependence of the industry on the United States has made Canadian producers highly susceptible to cyclical downturns in U.S. construction activity.

Offshore Markets -- While the United States will likely remain the major market outlet for Canadian softwood lumber production, joint industry-government efforts are currently underway to improve market access to the EEC, Japan and other offshore areas in order to more fully diversify the industry's market base.

Lumber with few exceptions enters major world markets on a duty-free basis. The important exceptions are Japan's 10 percent duty on the spruce-pine-fir species group, the EEC 5 percent duty on dressed lumber, and very significant tariffs on small-sized material in Australia and most countries in South America. Non-tariff measures such as building codes and product standards are in many cases a greater impediment to increased offshore exports than tariffs.

Offshore shipments have traditionally been clear and shop grade lumber for remanufacture, rough-sawn construction lumber and large size timbers, and have originated for the most part from the B.C. Coast. Since future increases in Canadian supply will be largely construction grade lumber manufactured to Canadian lumber standards, further penetration of overseas markets will require greater overseas recognition and acceptance of Canadian lumber species, specifications, and building methods. The acceptance of Canadian timber-frame construction methods and lumber standards by code authorities in Japan and a number of EEC countries is encouraging.

Hardwood Lumber

The hardwood lumber industry consists of approximately 200 establishments located mainly in the hardwood and mixed wood regions of southern Ontario and Quebec and to a lesser extent in New Brunswick. Many of these mills are small, individual or family-owned operations and are typically under-capitalized.

Production of hardwood lumber has been more or less static over the last decade and is currently about 4 to 6 percent of softwood production. Production in 1977 was 443 million board feet, of which 103 million board feet valued at \$48 million was exported, primarily to the United States. Exports, which are largely the select grades of yellow birch and maple, represent a much higher proportion of domestic production on a value basis than on a volume basis. Imports, mainly oak from the United States followed by mahogany and other tropical hardwoods, have been increasing steadily over the last decade. As a result, Canada has been a net importer of hardwood lumber since 1972.

TABLE 10

**Canadian Hardwood Lumber Production, Exports, Imports
and Apparent Consumption, 1963 - 1977**

| | (million board feet) | | | |
|------|----------------------|----------------|----------------|---------------------------------|
| | <u>Production</u> | <u>Exports</u> | <u>Imports</u> | <u>Apparent Consumption</u> |
| 1963 | 468 | 126 | 93 | 435 |
| 1968 | 589 | 142 | 108 | 555 |
| 1973 | 630 | 147 | 157 | 640 |
| 1974 | 611 | 117 | 157 | 651 |
| 1975 | 421 | 66 | 139 | 494 |
| 1976 | 510 | 92 | 215 | 633 |
| 1977 | 443 | 103 | 197 | 537 |

Source: Statistics Canada.

This pattern of static to declining domestic production coupled with increasing imports can be expected to continue, at least in the short to medium term. Although hardwoods represent about 20 percent of Canada's total merchantable timber volume, they only account for about 5 percent of the harvest and the industry continues to face severe constraints on its timber supply. The bulk of Canada's surplus hardwood timber reserves consists of less desirable species such as poplar that have relatively high processing costs and low product values or are in scattered stands that would not be economic to harvest in isolation. The supply of large diameter trees and species preferred by the lumber industry, particularly yellow birch, has been deteriorating as a result of heavy cutting or highgrading in previous years. Moreover, the ownership of a significant part of the lands supporting hardwood-based industries in Central and Eastern Canada is held by a large number of small woodlot owners and this has limited the consolidation of large blocks of timber and application of modern forest management practices. In addition, hardwood sawmills in many cases have not been able to share or transfer harvesting costs for low grade trees or portions of trees to other hardwood using units and have limited opportunities for offsetting production costs through residue sales.

Hardwood lumber is used primarily for office and household furniture and to a lesser extent for pallets and containers. With the conversion of furniture manufacturing to particleboard core, the market for edge-glued lower grade lumber panels has diminished. Demand is out of balance with the current product mix as available log supplies increasingly convert to a high percentage of lower grade material. The container and pallet industry will continue to take this low grade material but development of new market outlets or further processing into components will also be required.

In the longer term, given greater utilization of hardwoods for pulping which will result in improved logging cost structures and more intensified management of hardwood forest stands, the existing log supply situation could be improved. This is, however, a very long-term objective and is largely in the hands of the resource owners. However, there are sizable volumes of under-utilized hardwood timber available in Canada, especially in the Prairies and Central Canada, which could support greatly increased production of hardwood lumber if the economic environment justified a shift in emphasis towards species such as white birch and poplar.

PLYWOOD

Key Points

- . While softwood plywood production is still concentrated in several large, fully diversified companies on the B.C. Coast, nearly all expansion over the last decade has taken place in the B.C. interior and east of the Rockies.
- . The industry on the B.C. Coast produces a full range of plywood products. The product mix is currently about 55 percent sheathing and 45 percent sanded and specialty grades. In view of the declining availability of large diameter, high quality peeler logs on the B.C. Coast, there is little, if any, potential for increased production of sanded grades of softwood plywood.
- . Due to the nature of the resource, the industry in the B.C. interior and east of the Rockies is limited to sheathing grades, primarily spruce, and further expansion in the Canadian industry will take place largely in these regions.
- . The B.C. Coast industry is, in general, a high cost producer compared with its major competitors in the United States. Mills in the B.C. interior and east of the Rockies are generally competitive with U.S. sheathing producers largely because of lower wood costs.
- . Improved productivity and continuing viability of the B.C. Coast industry will require the continuance of a full modernization program which is under way in some mills.
- . Exports in 1977 represented 18 percent of total Canadian production. Exports to the U.S. are negligible because of high production costs of certain grades in Canada and a U.S. tariff of 20 percent. Exports of softwood plywood declined sharply in 1975 and 1976 because of intense competition from low cost U.S. and Asian plywood in traditional European markets. However, with the improvement in U.S. domestic demand and depreciation of the Canadian dollar, Canada has recovered ground since 1976 and is now the dominant exporter of softwood plywood to Europe.
- . Imports from the U.S. rose dramatically to a peak of 513 million square feet in 1975, about 23 percent of Canadian consumption despite a 15 percent Canadian tariff but have since declined to only 32 million square feet in 1977.
- . Imports from the U.S., however, are expected to continue to be a competitive factor in the Canadian market over the medium term, especially during periods of weak markets in the U.S. Competition from domestically produced waferboard and other composite panels in the domestic market is also expected to intensify in the future.

- The hardwood plywood and veneer industry excluding poplar is characterized by a number of older, small capacity mills with only a few large, modern units. Production of hardwood plywood and veneer has remained essentially static over the last 10 years. Low cost imports from Southeast Asia, particularly decorative panels have become a major factor in the Canadian market.
- The declining supply of high quality hardwood logs will continue to be a major constraint facing the Canadian industry. Some mills must import certain species such as oak.
- In general, the hardwood plywood industry does not have the specialized plant capacity, core stock or market opportunities to fully utilize the output of Canadian veneer mills, particularly for wall panelling. About 70 percent of hardwood veneer production is exported.
- Future growth in the hardwood plywood and veneer industry will depend on improved market access to the U.S., greater utilization of lower quality hardwood species, modernization programs for existing mills and closer integration of harvesting and manufacturing operations with other forest-based industries.
- The poplar plywood component of the hardwood industry is currently expanding the output of existing mills because of favourable market conditions but no new plywood mills based on poplar are expected in the near future.

Softwood Plywood and Veneer

The Canadian softwood plywood industry consists of 19 companies operating 31 mills and employing approximately 9,000 workers. In addition, there are nine mills producing only veneer for consumption in domestic and U.S. plywood plants. In 1977, the estimated value of softwood plywood and veneer shipments totalled \$625 million, of which about 16 percent was exported.

Production of softwood plywood is concentrated in several large fully integrated forest product companies located on the B.C. Coast. The five largest producers account for about 65 percent of total Canadian capacity although this concentration ratio has been declining with the increase in production outside of the B.C. Coast region. About 50 percent of total capacity is foreign-owned.

During the period 1963 to 1977, softwood plywood shipments increased from 1.4 billion square feet (3/8" basis) to 2.7 billion square feet, representing an average growth rate of 4.7 percent per year. It is evident that the softwood plywood industry is entering a more mature phase of development and that the high growth rates experienced during the 1960's and 1970's will not be sustained over the longer term.

Imports from the United States increased dramatically during the early 1970's from almost negligible levels to a peak of 513 million square feet in 1975, representing almost 23 percent of apparent domestic consumption in that year. Softwood plywood imports subsequently declined to 32 million square feet in 1977 because of a strong upswing in U.S. demand and are expected to stabilize at 50 million square feet per year over the medium term. The high level of imports in 1975 can be attributed to a combination of factors including pressures on U.S. producers to utilize excess capacity resulting from declining market conditions in the U.S. and disruptions to Canadian supply caused by labour disputes. However, imports of softwood plywood from the United States will likely continue to be a competitive factor in the domestic market, depending on prevailing market conditions in the U.S.

TABLE 11

Canadian Softwood Plywood Shipments
Exports, Imports and Apparent Consumption, 1963 - 1977

(millions of square feet - 3/8" basis)

| | <u>Shipments</u> | <u>Exports</u> | <u>Imports</u> | <u>Apparent Domestic Consumption</u> |
|------|------------------|----------------|----------------|--|
| 1963 | 1,389 | 210 | 1 | 1,180 |
| 1968 | 1,954 | 460 | 4 | 1,498 |
| 1973 | 2,428 | 492 | 105 | 2,041 |
| 1974 | 2,085 | 365 | 370 | 2,090 |
| 1975 | 2,022 | 282 | 513 | 2,253 |
| 1976 | 2,452 | 238 | 195 | 2,409 |
| 1977 | 2,689 | 416 | 32 | 2,304 |

Source: Statistics Canada.

Regional Share of Production -- British Columbia accounts for over 80 percent of total Canadian capacity. While the industry is still concentrated on the lower coast of British Columbia, nearly all expansion in recent years has taken place in the B.C. Interior which now accounts for about 43 percent of the total B.C. capacity. While new capacity will continue to be installed in the B.C. Interior over the coming years, the recently announced plans for modernizing some of the existing facilities on the B.C. Coast should also result in increased capacity in this region, particularly in sheathing grades. Only two new mills, one in Saskatchewan and one in New Brunswick, have been built in the rest of Canada during the last five years. The regional distribution of Canadian capacity has been estimated in Table 12.

TABLE 12

Estimated Canadian Softwood Plywood Capacity by Region, 1978

(millions of square feet - 3/8" basis)

| | <u>Volume</u> | <u>Percent</u> |
|----------------------|---------------|----------------|
| B.C. Coast | 1,650 | 49 |
| B.C. Interior | 1,240 | 37 |
| Prairies | 300 | 9 |
| Ontario and Atlantic | <u>180</u> | <u>5</u> |
| CANADA | 3,370 | 100 |

Source: Department of Industry, Trade and Commerce.

Log Supply -- Approximately 400 million board feet or 35 percent of the total softwood log volume converted annually to veneer and plywood in Canada is Douglas fir. This volume of Douglas fir has declined since 1970 while the use of other species has increased significantly. Production of high value sanded plywood, about 45 percent of the B.C. Coast production, requires the better grades of Douglas fir logs. Probably only 25 percent of the veneer produced on the coast is usable as sanded faces and even this requires extensive patching. The balance is only suitable for cores, backs or sheathing grades (unsanded). For this reason, B.C. mills import substantial volumes of face veneer from the United States, although this has decreased considerably over the last two years. Because of the declining availability of Douglas fir veneer, layup of panels has been modified to permit the use of other species for inner plies.

In summary, there is little, if any, potential for increased production of sanded plywood in Canada based on existing log supplies and levels of technology.

In contrast to the B.C. Coast raw material situation, the Canadian industry's major competition located in the U.S. Pacific Northwest, the heart of the Douglas fir range, has an advantage in terms of available log volume, grade and yield.

The industry in the B.C. Interior and east of the Rockies is based primarily on spruce and is limited to the production of sheathing grades of plywood. Since most of the incremental production of softwood plywood has originated in these regions, CSP (Canadian Softwood Plywood -- species other than Douglas fir) sheathing grades have steadily increased their share of production and now account for over one-third of the total Canadian supply of softwood plywood.

Until recently, exports have traditionally been virtually all Douglas fir, in both sanded and sheathing grades. Since 1976, the volume of CSP plywood exported to Europe has risen from almost negligible levels to 101 million square feet in 1977 and more than 250 million by year end 1978.

Productivity -- The increased utilization of smaller diameter logs has resulted in significant improvements in equipment and mill design for sheathing production with accompanying increases in productivity. Production patterns for sheathing mills are comparatively simple with only one or two veneer thicknesses and practically all veneer is of one grade. Finishing is basically trimming and grading, with minimum repair and only occasional touch sanding. Productivity is relatively high with an output of about 250-270 square feet (3/8") per man hour of direct production labour. In contrast, a typical B.C. Coast mill produces about 175 square feet per man hour for sheathing and about 150 for sanded grades. This can be largely attributed to declining log quality requiring increased panel patching, generally outdated equipment which was designed for much larger logs than those currently available and short production runs of various grades. As a result, two coastal mills have been converted exclusively to sheathing production and modernization of other existing mills to adapt to smaller diameter logs is under way or planned.

Improved productivity and continuing viability of the B.C. Coast industry will largely depend on the extent of this modernization program. Rebuilding of existing production units with higher speed lathes and clippers, automatic layup equipment and synthetic patching facilities represents significant capital expenditures.

Costs -- The B.C. Coast industry is, in general, a high cost producer compared to its major competitors in the coastal regions of Washington, Oregon and California (Douglas Fir Region). The U.S. Douglas Fir Region produces a full range of plywood products and accounts for about 60 percent of total U.S. softwood plywood production. Plywood producers in this region have lower wage rates, greater productivity, higher average log recovery and lower resin costs than on the B.C. Coast. Wood costs are also lower in the U.S. Douglas Fir Region but this advantage is diminishing somewhat with increased competition and higher stumpage rates for timber in the U.S. National Forests.

In contrast, sheathing mills in the B.C. Interior are relatively new and are generally competitive with sheathing mills in the U.S. Douglas Fir Region and in the U.S. South, largely because of low wood costs. The plywood industry in the U.S. South is less than 20 years old. Production of southern pine plywood has increased rapidly over the last two decades and now accounts for almost one-third of total U.S. production. Similar to plywood plants in the B.C. Interior and east of the Rockies, U.S. southern producers are limited primarily to sheathing grades of plywood.

There are significant differences, however, in the type and grade of softwood plywood produced in Canada and the United States. All softwood plywood manufactured in Canada is fully waterproof and is classified as exterior type. In contrast, interior types which in general use lower quality veneers and/or non-waterproof glues account for about one-third of U.S. sanded production and for about 90 percent of U.S. sheathing grades.

While manufacturing costs of softwood plywood are explored in greater detail in a later section of the report, Table 13 provides a summary of comparative costs in the major U.S. and Canadian regions.

TABLE 13
Comparative Production Costs, 1975

(U.S. Douglas Fir Region = 100.)

| | <u>U.S.</u> <u>Douglas Fir</u> | <u>U.S.</u> <u>South</u> | <u>B.C.</u> <u>Coast</u> | <u>B.C.</u> <u>Interior</u> |
|--------------------------|-----------------------------------|-----------------------------|-----------------------------|--------------------------------|
| Sheathing/Sanded Grades* | 100 | - | 128 | - |
| Sheathing Grades | 100 | 102** | - | 91 |

Source: Price Waterhouse & Co.

* Reflects the total product mix produced in the two regions.

** Based on 1974 cost comparisons.

Markets -- The industry sells a high proportion of its production in domestic markets with some 84 percent of total softwood plywood shipments being sold in Canada in 1977. The major end-use applications for softwood plywood in Canada are estimated in Table 14.

Table 14

| <u>End-Use Markets</u> | <u>(Percent)</u> |
|------------------------------|------------------|
| Residential construction | 27 |
| Home renovation | 25 |
| Industrial | 21 |
| Non-residential construction | 14 |
| Farm and others | <u>13</u> |
| | 100 |

Source: Department of Industry, Trade and Commerce.

The most significant development in the marketing of Canadian softwood plywood in recent years has been the emergence of the United States as a major competitor in both domestic and traditional export markets. While competitive pressures from U.S. producers have declined markedly since 1976 due to improved market conditions in the U.S. and depreciation of the Canadian dollar, competition from U.S. plywood will likely continue to be a factor over the medium term, particularly during market downturns in the U.S.

In addition to imports, competition from waferboard, a domestically produced exterior particleboard panel, and other composite panels is becoming increasingly significant. Production of waferboard is concentrated comparatively close to the large Eastern Canadian markets and is expected to continue to increase rapidly over the next few years.

Exports of softwood plywood which originate almost entirely from the lower coast of British Columbia declined sharply in 1975 and 1976 when exports represented only 10 to 15 percent of total Canadian output. Severe price competition from U.S. producers who established new marketing organizations in Europe during this period was a major factor contributing to this decline. Since 1976, Canada has recovered its dominant position in Europe and will probably export in excess of 500 million square feet in 1978.

The traditional export market is Britain followed by the Benelux countries, France, West Germany, Italy and Denmark. Exports to the European Common Market account for nearly 98 percent of total Canadian exports. Most of Canada's plywood exports enter the EEC under a duty-free quota which is adjusted annually to reflect supply/demand conditions. Distribution of Canadian exports is shown in Table 15.

TABLE 15

Canadian Shipments and Exports of Softwood Plywood, 1968-1977

(millions of square feet -- 3/8" basis)

| <u>Year</u> | <u>Total Shipments</u> | <u>Exports</u> | | | | |
|-------------|------------------------|----------------|----------------|--------------|--------------|--------------|
| | | <u>Total</u> | <u>Britain</u> | <u>Other</u> | <u>Japan</u> | <u>Other</u> |
| | | | | <u>EEC</u> | | |
| 1968 | 1,954 | 460 | 326 | 102 | 5 | 27 |
| 1970 | 1,932 | 385 | 268 | 97 | 10 | 10 |
| 1973 | 2,428 | 492 | 330 | 148 | 3 | 11 |
| 1974 | 2,085 | 365 | 249 | 88 | 2 | 26 |
| 1975 | 2,022 | 282 | 211 | 67 | 1 | 3 |
| 1976 | 2,452 | 238 | 171 | 60 | 2 | 5 |
| 1977 | 2,689 | 416 | 217 | 192 | 1 | 6 |

Source: Statistics Canada.

It is likely that Britain will continue as Canada's largest single export market. Canadian plywood is regarded as a quality product particularly in the upper grades such as concrete forms. Furthermore, Canadian shippers have established extensive dock and distribution facilities in Britain and utilize large capacity vessels with mixed cargoes of plywood, lumber and pulp and paper facilitating economies in transportation.

Demand for construction grade plywood is expected to grow rapidly in Western Europe during the next ten years but in order to increase Canada's share in these markets, Canadian producers will have to meet competition from U.S. suppliers in addition to Scandinavian, Southeast Asian and domestic sources of supply. The approval from DIN (Standards) authorities in West Germany in 1976 allowing use of Canadian construction plywood in residential construction has removed a major constraint and will likely result in increased sales to this market.

In Japan, the introduction of the Canadian timber frame system of residential construction in 1974, while of particular benefit to the lumber sector, has resulted in a potential market for sheathing plywood. However, volume penetration of this market will require resolution of problems relating to product standards. As in the case of Europe, the major outside competition in Japan will be from U.S. suppliers. Moreover, Japan and other countries in Southeast Asia have large domestic hardwood plywood industries based almost exclusively on imported logs and producing both exterior construction grade and decorative panels. Competition from these producers will be a further constraint to expanded sales of Canadian softwood plywood in Japan. The current problems of overcapacity in the Japanese industry are not conducive to significant penetration of this market in the short term.

Hardwood Plywood and Veneer

The hardwood plywood and veneer industry consists of 28 companies operating 33 mills and employing about 3,500 to 4,000 workers. The combined sales of hardwood plywood and veneer amounted to about \$160 million in 1977. In addition to the primary producers, there are four prefinishing mills in Canada which specialize in factory-finishing plywood blanks, both domestic produced and imported, from Southeast Asia, and domestic hardboards into a wide range of colours, prints and simulated grain patterns for the decorative wall panelling market.

The industry is characterized by a relatively large number of older, small capacity plants. However, many of these are subsidiaries of major forest products companies. Little if any investment in new capacity (except replacement of two mills) has taken place over the last ten years. While the production facilities of some mills have received various degrees of updating over the years, only three mills can be considered modern and integration with other wood-using industries is minimal. These modern mills are competitive with comparable mills in the United States, which also has many older hardwood mills, but because of small-scale production and lower quality log supplies they are less efficient than the new, large-scale mills in Southeast Asia.

The industry is labour intensive due to the grading and sorting requirements for veneer and because of the custom-type manufacturing in which many plywood mills are engaged. It has been estimated that hardwood veneer mills require about seven times the number of workers per unit of log input compared to hardwood lumber mills and this factor increases to about 10 for hardwood veneer/plywood operations.

The industry is located in five provinces but is concentrated in the hardwood forest regions of Ontario and Quebec where it is considered a major source of income and employment in many smaller communities. Mill locations are listed in Table 16.

TABLE 16

Distribution of Hardwood Plywood and Veneer Mills in Canada, 1976

| | <u>Veneer Only</u> | <u>Veneer and Plywood</u> | <u>Plywood Only</u> | <u>Prefinish Only</u> |
|------------------|------------------------|-------------------------------|-------------------------|---------------------------|
| Ontario | 10 | 2 | 2 | - |
| Quebec | 8 | 5 | 3 | 3 |
| British Columbia | - | - | 1 | 1 |
| New Brunswick | 1 | - | - | - |
| Newfoundland | - | 1 | - | - |
| CANADA | 19 | 8 | 6 | 4 |

Source: Department of Industry, Trade and Commerce.

Hardwood Veneer -- Production of hardwood veneer has remained relatively static over the last decade. The total value of shipments of hardwood veneer for sale as such amounted to \$60 million in 1977, \$49 million of which was exported, mainly to the United States.

The bulk of hardwood veneer produced in Canada is rotary cut from native deciduous species, principally yellow birch. Use of other species such as white birch and maple has become increasingly necessary. The supply of yellow birch peeler logs is declining and competition from sawmills for available logs is intensive. As in the case of hardwood lumber, the industry's log supply problems are compounded by the lack of opportunities to dispose of low quality logs and/or residues that develop in harvesting and manufacturing. Faced with declining volumes and quality of log inputs, the industry has been able to maintain production levels by reducing the market grade and average thickness of birch veneers by up to 50 percent without appreciably affecting market acceptance. Currently, rotary cut oak is in demand and is being produced in Canada from imported logs. In addition to the rotary veneer mills, three mills specialize in slicing imported walnut and mahogany logs into high-value veneers for sale to furniture producers in Canada and Europe.

The domestic hardwood plywood industry currently does not have the specialized plant capacity, source of low priced core stock, or market opportunities to fully absorb the output of Canadian rotary veneer mills. Most of this surplus production is exported to the United States for use by cabinet/ furniture manufacturers and as face veneers by plywood mills in Washington and Oregon for the production of decorative wall panels. Imports of hardwood veneer amounted to 157 million square feet valued at \$10 million in 1977 and are largely non-indigenous species required by the furniture and plywood industry to supplement domestic supply.

TABLE 17

**Canadian Shipments, Exports and Imports
of Hardwood Veneer, 1963-77**

(million square feet -- surface measure)

| | <u>Shipments*</u> | <u>Exports</u> | <u>Imports</u> | <u>Apparent Domestic Consumption</u> |
|------|-------------------|----------------|----------------|--|
| 1963 | 1,010 | 719 | n/a | n/a |
| 1968 | 1,404 | 905 | 172 | 671 |
| 1973 | 1,168 | 1,064 | 213 | 317 |
| 1974 | 922 | 780 | 230 | 372 |
| 1975 | 910 | 673 | 142 | 379 |
| 1976 | 1,167 | 944 | 188 | 411 |
| 1977 | 1,204 | 933 | 157 | 428 |

Source: Statistics Canada

* Excludes shipments to Canadian veneer and plywood plants.

Hardwood Plywood -- Shipments of hardwood plywood, excluding exterior grade poplar, have ranged between 180 and 231 million square feet over the last decade while at the same time imports have steadily captured a greater share of the Canadian market. Exterior grade poplar plywood competes directly with softwood plywood in many sheathing end-use applications in the domestic market and is not usually considered part of the hardwood plywood industry. Annual production of poplar plywood has remained at about 180 to 200 million square feet (1/4") during the 1960's and early 1970's. Despite a sharp increase to 268 million square feet in 1977, it is unlikely that any new mills will be built in the medium term in view of the problems associated with log qualities, low yields and high processing costs.

TABLE 18

**Canadian Shipments, Exports and Imports
of Hardwood Plywood, 1963-77**

(million square feet -- 1/4" basis)

| | <u>Shipments*</u> | <u>Exports</u> | <u>Imports**</u> | <u>Apparent Domestic Consumption</u> |
|------|-------------------|----------------|------------------|--|
| 1963 | 182 | 49 | 93 | 226 |
| 1968 | 178 | 37 | 204 | 345 |
| 1973 | 191 | 60 | 477 | 608 |
| 1974 | 189 | 40 | 418 | 567 |
| 1975 | 193 | 55 | 390 | 528 |
| 1976 | 225 | 33 | 396 | 588 |
| 1977 | 231 | 57 | 340 | 514 |

Source: Statistics Canada.

* Does not include exterior-grade poplar plywood.

** Reported surface measure imports from 1973-77 have been adjusted to more closely approximate the 1/4" basis used in earlier years.

The three basic types of hardwood plywood produced in Canada include decorative wall panelling, doorskins and industrial panels.

Canadian production of decorative wall panelling has declined markedly. The domestic market is now dominated by low cost lauan imports, mainly from Taiwan followed by Korea, Japan, Philippines and Malaysia. The delivered cost of this plywood is about one-half of the equivalent grades and thicknesses produced in Canada. About one-half of lauan wall panels are imported in a fully prefinished state with the remaining half either sold to the furniture and millwork industries in an unfinished form or further processed by Canadian hardwood plywood and prefinishing mills. Low cost, printed wall panels produced by the Canadian hardboard industry are generally competitive with imported plywood and introduce further competitive pressures in the domestic market.

The lack of low-priced core material for wall panelling has been a major constraint affecting the competitive position of the domestic industry for many years. However, recent trends in new particleboard/fibreboard cores may encourage a greater degree of domestic production of low cost wall panelling which will tend to offset imports from Southeast Asia and reduce dependence on U.S. markets for veneer sales.

Production of doorskins in Canada is concentrated in two mills specializing in this type of plywood. Nearly all of the output of these two mills is exported to the United States, accounting for about three-quarters of total Canadian exports of hardwood plywood. Most of the doorskins used by Canadian door manufacturers are imported from Southeast Asia.

In order to remain competitive, the Canadian hardwood plywood industry has shifted production toward thicker sized hardwood panels for specialized industrial and cut-to-size applications. The market for industrial types of hardwood plywood is growing in Canada and in the Northeastern United States and is primarily supplied by Finnish birch producers at the present time. There is a large volume of lower quality birch timber in Eastern Canada and parts of B.C. which has a potential for processing into industrial plywood. Successful development of U.S. markets, however, will require improved market access and major structural changes in the industry in order to produce the custom grades, sizes and thicknesses of industrial panels demanded by the market. Some producers have initiated export market development efforts in the Northeastern U.S.

In summary, future growth in the hardwood plywood and veneer industry will depend on improved market access to the U.S., greater utilization of lower quality hardwood species, implementation of modernization programs in some mills and closer integration of harvesting and manufacturing operations with other forest-based industries. In some cases, the rationalization of existing plant locations and log supplies will also be required.

PARTICLEBOARD

Key Points

- Both domestic production and consumption of industrial particleboard grew rapidly during the 1960's and early 1970's. Industry shipments in 1977 amounted to 348 million square feet valued at \$52 million, more than three times the level recorded in 1968.
- Essentially all industrial particleboard produced in Canada is sold in the domestic market although exports to the U.S. will be about 35 to 40 million square feet in 1978, about 10 percent of domestic production.
- Imports from the U.S. made major inroads in the Canadian market during the early 1970's reaching a peak of about 194 million square feet or almost one-half of total domestic consumption in 1974. Imports have subsequently declined but still represent a significant part of Canadian consumption since certain types are not made in Canada due to the relatively small volumes involved.
- With the exception of three mills, the Canadian industrial particleboard industry is characterized by generally small-scale production units which in many cases are still based on roundwood. By comparison, U.S. plants are significantly larger and utilize wood residues to a much greater extent. The cost of residues has increased rapidly in the U.S. in recent years which has reduced their former cost advantage over roundwood.
- The previous high rates of growth in consumption of industrial particleboard can largely be attributed to increased use and product substitution in furniture manufacturing. The prospects for future growth in the industry are not likely to be as high as earlier years but will still be significant.
- Domestic consumption of industrial particleboard is projected to grow to one billion square feet in 1985, about double current consumption. Major areas for growth include expanded application in prefabricated housing and mobile home production and increased use by domestic prefinishers.
- Waferboard, an exterior grade particleboard, is a recent development and with the exception of one mill in the U.S. is largely a Canadian product. Productive capacity has increased from about 120 million square feet in 1972 to the current 535 million square feet. In addition, several new plants are expected to come on stream by 1983 raising total Canadian capacity to one billion square feet.
- Large-scale Canadian waferboard plants coupled with a sizable low-cost material base of under-utilized hardwood species gives Canada a distinct advantage in the reconstituted exterior wood panel field over the next five years.

- . Efforts to develop markets for Canadian waferboard in the United States and to a lesser extent in Europe, have been very encouraging. Exports are estimated at about 260 million square feet in 1977, representing some 50 percent of total Canadian production.
- . Waferboard, together with other composite panels that are in various stages of development are expected to exert strong competitive pressures on traditional end-use markets for softwood plywood.
- . New waferboard and other structural panel mills are currently under construction in the U.S.: This will introduce new competition for Canadian shippers in the period 1980 onward.

Main Types of Particleboard

There are two main types of particleboard produced in Canada:

Industrial Particleboard is made by mechanical breakdown of wood material such as logs, planer shavings, sawdust, and other mill waste into a very fine particle. The particles are then coated with liquid adhesive (generally urea-formaldehyde) to make a non-exterior quality panel suitable for core stock for cabinets, panelling, furniture, etc. It is made in thicknesses from 1/8" to 1". A very small volume of this is glued with phenolic adhesive which is waterproof.

Waferboard is made by flaking or waferizing roundwood or sometimes large slabs to produce a flat rectangular flake of constant thickness (at least 30 mm in length). These are coated with phenol-formaldehyde adhesive to produce an exterior quality panel suitable for construction and various other uses such as sheathing, crating, screening, etc. It has similar end-use applications as softwood plywood. The panel, with a wide, flaky appearance, is normally made in thicknesses from 5/16" to 3/4", although 7/16" is generally the upper limit.

Industrial Particleboard

The industrial particleboard industry consists of 13 mills with a combined productive capacity of about 600 million square feet (5/8" basis). Four firms also operate in-plant prefinishing and/or plastic overlaying facilities to extend their market opportunities and to improve mill returns.

The Canadian industry is located in Ontario (six plants), New Brunswick (two), British Columbia (two), Quebec (two) and Newfoundland (one). Both domestic production and consumption of industrial particleboard grew rapidly during the 1960s and early 1970s. Industry shipments in 1977 amounted to 348 million square feet valued at \$52 million, more than three times the level recorded in 1968. Essentially all industrial particleboard produced in Canada is sold in the domestic market, although an estimated 35 to 40 million square feet was exported in 1978. One new mill is currently exporting part of its production to its U.S. parent and several other mills have had some success in penetrating the U.S. market but the volumes are still relatively small. Imports from the U.S. made major inroads in the Canadian market during the early 1970's reaching a peak of about 194 million square feet or almost one-half of total domestic consumption in 1974. Imports subsequently declined to 64 million square feet in 1977, about 17 percent of Canadian consumption.

TABLE 19

Estimated Shipments, Imports and Consumption of
Industrial Particleboard, 1964-77*

(million square feet -- 5/8" basis)

| | <u>Domestic Shipments</u> | <u>Imports</u> | <u>Apparent Consumption</u> |
|------|-------------------------------|----------------|---------------------------------|
| 1964 | 68 | 2 | 70 |
| 1968 | 105 | 14 | 119 |
| 1973 | 230 | 134 | 364 |
| 1974 | 210 | 194 | 404 |
| 1975 | 230 | 142 | 372 |
| 1976 | 321 | 92 | 413 |
| 1977 | 348 | 64 | 412 |

Source: Department of Industry, Trade and Commerce

- * Prior to 1977, Statistics Canada did not disaggregate particleboard statistics into the two major type classifications.

Competitive Position -- There are significant differences between the Canadian and U.S. industries with respect to scale, raw material and location. With the exception of three mills, the Canadian industry is characterized by small production units, usually less than 60 million square feet per year. By comparison, more than 50 percent of U.S. output originates in mills with annual capacity in excess of 100 million square feet resulting in greater productivity and significantly lower labour costs per unit of output. The production of particleboard is capital intensive and fixed costs represent a major proportion of total operating costs. Previously, most of Canada's productivity capacity, while located in Central and Eastern Canada close to major domestic markets, was based largely on purchased roundwood. This has changed somewhat and larger volumes of mill waste are being utilized. On the other hand, about half of U.S. capacity is located in the Pacific Northwest and utilizes the once abundant but now declining supply of non-chippable sawmill and plywood plant residues available in the area. The tightening raw material supply in the U.S. and corresponding increases in fibre prices have significantly changed the competitive position of Canadian producers with respect to their counterparts in the U.S.

In addition to wood the other major cost component in the manufacture of particleboard is resin. In 1975, the combined cost differential from raw material and resin was estimated to be from \$24 to \$36 per thousand square feet of particleboard. As a result, the larger U.S. plants were able to compete effectively with the Canadian industry in prime Eastern Canadian markets despite high freight costs and a 15 percent Canadian tariff. Resin prices are reportedly 10 to 15 percent higher in Canada than in the U.S. and this coupled with higher resin input per unit of output results in a cost disadvantage to Canadian mills of \$5 to \$8 per thousand square feet.

Markets -- Most industrial particleboard produced in Canada is sold in the domestic market. It is used in a wide variety of end-use applications such as furniture, kitchen cabinets, mobile homes and for interior uses in residential construction. The greatest market penetration has taken place in furniture manufacturing, where particleboard replaced sanded grades of softwood plywood and edge-glued lumber panels.

According to a 1975 report prepared by Columbia Engineering International Ltd. for the Departments of Industry, Trade and Commerce and Regional Economic Expansion, significant growth in domestic consumption is expected for the next decade. Major growth in consumption is projected for use as core material by prefinishers as well as in the manufacture of prefabricated and mobile homes.

Using a projected annual rate of growth of 11.5 percent for the period 1976-1980, followed by a rate of 7 percent from 1981-1985, Canadian consumption is estimated at one billion square feet by 1985. If this is to be supplied from domestic sources, three new plants with an average annual capacity of 100 million square feet will be required in addition to the one completed in 1977.

The Columbia Engineering International Ltd. report also projected significant growth in U.S. demand with resulting export opportunities for Eastern Canadian suppliers. However, in order to develop this export capability, Canadian mills will have to be of sufficient scale, utilize low cost wood residues as raw material and be fully competitive with U.S. producers. Construction of new, large-scale particleboard plants in Canada could adversely affect the viability of some of the smaller existing mills which would have to adjust to this new competitive environment through plant modifications or addition of prefinishing or remanufacturing operations.

Waferboard

Waferboard is unique to North America and with the exception of one mill in the U.S. is largely a Canadian product.

In contrast to industrial particleboard, waferboard is an exterior grade panel and is essentially an alternative to sheathing grades of softwood plywood for many end-use applications. Moreover, roundwood or slabs and edgings must be used as the basic raw material in order to obtain the required flake size and thickness. The major use is in residential construction and farm structures in such applications as roof and wall sheathing, subflooring, cladding (exterior and interior), temporary and permanent fencing, soffits, and carport ceilings.

Existing and Projected Capacity -- Prior to 1972, the industry consisted of one plant of 120-130 million square feet annual capacity (3/8" basis) located in Hudson Bay, Saskatchewan. Five additional plants have since come on stream, four in Ontario and one in Alberta. Excluding the Alberta mill which shut down after only a few weeks production, total Canadian capacity of the five mills currently in operation is 535 million square feet.

Significant amounts of new capacity are being added to the Canadian industry. One existing mill is adding new production facilities to reach the absolute capacity of its press. In addition, Northwood Panelboards Ltd. is currently converting its industrial particleboard mill near Chatham, N.B., to produce waferboard at an annual capacity of 150 million square feet with start-up scheduled for mid-1979. This mill will be the first to utilize dense hardwoods in addition to the more traditional use of poplar and will be well placed, with its existing deep sea wharf, for export to Europe.

Taking into account existing capacity, the several mills currently under consideration in Ontario and Quebec, the possible reactivation of the Alberta mill, and the new capacity referred to above that is already under construction, there could be 12 mills operating in Canada by 1983 with a total installed capacity of about 1.3 billion square feet.

Production, Shipments and Apparent Domestic Consumption -- Table 20 illustrates the rapid development of the Canadian waferboard industry since 1970. The figures presented in the table have been estimated by the Department of Industry, Trade and Commerce based on unpublished industry sources since Statistics Canada did not publish separate domestic statistics on the waferboard industry until 1977 and export data are still not available.

TABLE 20

**Estimated Production, Domestic Shipments and Exports
of Waferboard, 1970 - 1977**

(million square feet -- 3/8" basis)

| | <u>Production</u> | <u>Shipments</u> | | |
|------|-------------------|------------------|-------------|------------|
| | | <u>Domestic</u> | <u>U.S.</u> | <u>EEC</u> |
| 1970 | 65 | 62 | - | - |
| 1971 | 110 | 100 | 5 | - |
| 1972 | 125 | 110 | 10 | - |
| 1973 | 160 | 140 | 17 | - |
| 1974 | 245 | 175 | 50 | - |
| 1975 | 310 | 160 | 135 | 10 |
| 1976 | 356 | 165 | 147 | 10 |
| 1977 | 409 | 195 | 231 | 8 |

Source: Department of Industry, Trade and Commerce.

Future Trends -- Since the waferboard industry is relatively new, the annual increases in production and shipments are large and tend to exaggerate the long-term trend. This fast rate of growth is due largely to the unexpectedly high rate of penetration into the United States market over the 10 percent U.S. tariff coupled with an appreciable displacement of softwood plywood in the domestic market. In 1970, domestic consumption of waferboard represented 3.8 percent of the combined domestic consumption of waferboard and softwood plywood of 1.6 billion square feet. In 1977, the waferboard share doubled to 7.8 percent based on a domestic consumption of both products of about 2.5 billion square feet.

Canada has been in the forefront in the development of a competitive reconstituted exterior grade panel. The existence of large-scale plants, coupled with an abundant supply of low-cost raw material such as poplar, gives Canada an immediate advantage in this field. However, a sustained research effort to develop advanced forms of other exterior grade composite panels is currently under way in the United States and to a lesser extent in Canada which will compete with Canadian waferboard and softwood plywood. The combination of particleboard cores with softwood veneer faces and backs is clearly the next step for the industry.

PULP AND PAPER PRODUCTS

The Canadian pulp and paper industry comprises some 75 companies with more than 140 manufacturing establishments. In the period 1974 to 1978, the industry experienced substantial variation in the volumes and values of both shipments and exports.

Shipments and exports peaked in 1974, with both a substantial increase in volumes and a sharp upturn in prices compared to 1973. In 1974, the industry shipped about 23 million tons valued at \$5.7 billion and exported over 17 million tons valued at \$4.0 billion. Both 1975 and 1976 were considered abnormal years due to major labour difficulties and a marked decrease in world demand. The volumes of shipments and exports declined significantly in those years from 1974 while the corresponding values were less affected. In 1975 and 1976, the values of shipments were \$5.1 billion and \$6.0 billion respectively and exports were \$3.9 billion and \$4.5 billion.

In the latter part of 1977, market demand improved and prices strengthened. The trend continued into 1978 with industry shipping an estimated 23.2 million tons valued at \$7.5 billion and exporting 17.7 million tons valued at \$5.6 billion.

In the last decade, 18 companies have entered the industry, establishing new operations in eight of ten provinces. Initial financing came not only from Canada but also from the United States, Britain, West Germany, Italy, Finland, Denmark, Japan, France and Sweden. However, upwards of 50 per cent of total manufacturing capacity is Canadian controlled.

The industry employs about 140,000 persons in woodlands and mill operations. Nearly 50 per cent of manufacturing capacity is located in cities and towns having populations of less than 10,000 and about 90 per cent in communities of less than 100,000. There are over 100 pulp and paper communities, many totally dependent on the mill or mills for their existence. Table 21 indicates the relative size of product sectors in the industry.

TABLE 21

Pulp and Paper Products

Production and Exports, 1976

| | <u>Production</u> | | <u>Exports</u> | |
|--|-------------------------|----------------|-------------------------|----------------|
| | <u>Million Tons</u> | <u>Percent</u> | <u>Million Tons</u> | <u>Percent</u> |
| Market wood pulp* | 6.9 | 34 | 6.8 | 43 |
| Wood pulp consumed in Canadian mills to produce: | | | | |
| Newsprint | 8.9 | 44 | 7.8 | 50 |
| Other paper and paperboard** | 4.0 | 19 | 1.0 | 6 |
| Building paper and board** | <u>0.6</u> | <u>3</u> | <u>0.2</u> | <u>1</u> |
| TOTAL | 20.4 | 100 | 15.8 | 100 |

Source: Canadian Pulp and Paper Association

* The term market wood pulp describes pulp which is sold in domestic and international markets and excludes pulp which is shipped to affiliated companies or consumed on site to produce newsprint, other paper and paperboard, and building paper and board.

** Includes pulp fibre derived from waste paper.

WOOD PULP

Key Points

- Market wood pulp production tends to be highly cyclical due to fluctuations in world markets.
- Due to wood density differences, approximately 20 percent less wood volume is required per ton of pulp produced from U.S. Southern pine versus Eastern Canadian wood. In addition, the price per cord in the South East U.S. is \$10 to \$20 cheaper. The combination results in a cost advantage to the U.S. South East of \$30 to \$50 per ton of bleached kraft pulp.
- In British Columbia where over half of Canadian market pulp is manufactured the differential in wood costs compared to the U.S. is much less pronounced. This is particularly true of the B.C. Interior region where the exclusive use of sawmill residues provides wood at a cost comparable to the U.S. (see section on Wood, Manufacturing and Distribution Costs).
- Due to increasing costs, the minimum economic size of a new bleached kraft mill has increased from 350 tons a day in 1965/66 to 750 to 1,000 tons/day in 1975. More than 62 percent of Canadian pulp mills have a capacity in excess of 500 tons a day.
- Some older mills, because of natural advantages such as location and much lower depreciation and other capital related expenses are competitive with new mills. This leads to economic advantages in modernization of existing facilities compared to new mill expansion.
- As current capital costs have increased faster than pulp prices, it is expected that new major capacity increases will not be achieved in the near future. This could lead to shortages and higher prices in the intervening period.
- The need for smaller mills has contributed to the consideration of thermo-mechanical market pulp mills (TMP). While TMP is less expensive to produce due to lower wood requirements per ton of product and smaller economic scale, and while it provides advantages in areas of scattered timber stands it is only partially interchangeable with other grades of pulp. As a result the market is small, uncertain and subject to large price fluctuations. In integrated newsprint mills, however, TMP, produced on site, is finding increasing use.
- Wood pulp enters most countries duty free.

- Wood pulp exports grew at 7 percent per year between 1963 and 1973, while the Scandinavian share of exports decreased because of dwindling resources and upgrading policies. Continuation of this trend should open further pulp markets to Canada over the next 10 to 15 years.
- U.S. consumes approximately 50 percent of Canada's pulp exports, EEC 28 percent and Asia 13 percent. Exports to Asia (other than Japan) are unlikely to increase before 1985.
- Since Canadian producers compete in large world markets with many external demand and supply factors, they have limited control over the pricing of their products and in some respects are considered as marginal suppliers. Multinational ownership of world pulp mills and captive markets of large companies are also factors affecting market demand.
- Prices in current dollars changed little through the '60s and early '70s. They increased sharply in 1974-75 as demand rose relative to supply but declined substantially during 1976-77 when the reverse situation developed.
- There is a trend for developing countries to install mills producing pulp primarily for domestic use from indigenous fibre, often tropical hardwoods, bagasse or other vegetable fibre. Technical problems associated with these raw materials are under study. The pulp is generally of inferior quality but is considered acceptable for domestic use by these countries. The expansion in the use of Brazilian hardwood and movement to use softwoods from plantations may eventually lead to their penetration of world pulp markets.

Pulp Types and Characteristics -- Wood pulp (hereafter referred to as pulp) is the basic component of almost all types of paper and paperboard. It is sold as market pulp, shipped to affiliated paper mills or consumed in paper and paperboard mills to produce newsprint, other paper and paperboard, and building paper and board. In addition, a highly purified form known as dissolving pulp, is used in the manufacture of rayon, cellophane, and certain chemical products.

Mechanical pulping yields almost twice as much pulp per cunit of wood as most chemical pulping methods, but the product produces relatively weak, coarse, low brightness papers. Its major use is in newsprint and similar low cost papers, and in tissue.

The two main chemical pulping processes are the sulphite and the sulphate or kraft processes, distinguished by the chemicals employed. Kraft pulp has the strongest fibre and is used both as market pulp and for production of paper and board in integrated mills. Compared with kraft, sulphite pulp has higher unbleached brightness and for newsprint purposes can be produced at much higher yields. Sulphite mills formerly required lower capital investment but this advantage has largely disappeared because of the need to overcome environmental problems caused by the spent sulphite pulping liquor. About two-thirds of Canadian sulphite pulp is used as a component of newsprint, 10 percent is transferred to affiliated companies for conversion into fine papers or tissue and 20 percent is sold on the open market where, because of lower strength properties, it usually commands a lower price than kraft.

While both hardwoods and softwoods can be used for the manufacture of wood pulp, hardwood pulps have had more limited use in Canada due to their lower strength properties. In addition, there is more competition for Canadian hardwood pulp from sulphite softwood pulp and secondary fibres, as well as from hardwood pulp from the southern U.S. and elsewhere. Most hardwood pulp is kraft.

Industry Size and Structure -- In 1976, 147 Canadian integrated and non-integrated pulp and paper mills produced 19.8 million tons of wood pulp representing 16 percent of total world production. Canadian production has kept pace with the world trend, increasing at an average annual rate of 5 percent during the previous ten years, with much of the growth taking place in British Columbia. In terms of grades, kraft pulp represents 42 percent, mechanical pulp 40 percent and sulphite pulp 13 percent of total Canadian production. Capacity increases have been mainly in kraft grades because of the stronger market demand. Production of sulphite peaked in 1966 and because of pollution and other problems is not likely to increase significantly in the future.

The regional breakdown of Canadian wood pulp production is shown in Table 22.

TABLE 22

Canadian Wood Pulp Production and Capacity, 1976

| | <u>Production</u> <u>('000 tons)</u> | <u>Percent of</u> <u>Total</u> <u>Production</u> | <u>Capacity</u> <u>('000 tons)</u> | <u>Percent of</u> <u>Total</u> <u>Capacity</u> |
|------------------|---|--|---------------------------------------|--|
| Quebec | 6,483 | 32 | 8,383 | 33 |
| British Columbia | 5,864 | 30 | 6,696 | 27 |
| Ontario | 3,373 | 17 | 4,712 | 19 |
| Others | <u>4,062</u> | <u>21</u> | <u>5,391</u> | <u>21</u> |
| CANADA | 19,782 | 100 | 25,185 | 100 |

Source: Canadian Pulp and Paper Association

As indicated in Table 23, world wood pulp production is concentrated in the United States, Canada and Scandinavia.

TABLE 23

World Wood Pulp Production, 1976

| | <u>'000 Tons</u> | <u>Percent</u> |
|-----------------------------|------------------|----------------|
| United States | 45,338 | 37 |
| Canada | 19,728 | 16 |
| Scandinavia | 17,054 | 14 |
| European Economic Community | 6,009 | 5 |
| Japan | 10,474 | 8 |
| U.S.S.R. | 9,019 | 7 |
| Others | <u>16,361</u> | <u>13</u> |
| TOTAL | 123,983 | 100 |

Source: Canadian Pulp and Paper Association

Mill Size, Age and Viability -- The rapid escalation in equipment and construction costs coupled with increasing plant size over the last five years has made the pulp industry one of Canada's more capital-intensive industries. The capital outlay for new bleached kraft pulping capacity has increased from \$110,000 per daily ton in 1972 to a current cost approaching \$300,000 per daily ton. This represents a capital expenditure of \$344,000 per employee. At current cost/price levels required for large new mills, some industry officials believe that government assistance is necessary to provide an adequate projected return on investment. Moreover, the three years required for construction adds to the risk and increases financing cost, particularly under recent inflationary conditions. New kraft mills have increased from 350 tons per day (TPD) in 1965/66 to 500 in 1968/72 and to the current 750 to 1,000 in an effort to keep production costs competitive through economies of scale. A survey completed by the EEC in 1971, comparing the size of pulp mills in the EEC and principal world competitors, placed Canada in first position with the largest average pulp production per mill, followed by the United States and Finland. More than 60 percent of Canadian pulp mills have a daily capacity of 500 tons or more, and one-third of these produce over 1,000 tons per day. Nearly all pulp mills built in Canada during the past decade have been in the 500-tons-per-day or over range.

The situation varies for the older mills. Some have natural advantages such as company owned hydro-electric plants. The original construction costs were much lower than present day mills, and these costs have been largely depreciated. Nearly all mills have had substantial capacity expansion through the years, and varying degrees of optimization* have taken place. Many would be fully competitive with a new mill built in the same general locality because their higher operating costs would be offset by the much higher capital-related charges per ton of output that a new mill must include in its costs. Such mills can become more profitable through increased optimization.

A few mills which have become uneconomic due to a combination of circumstances, such as depleting wood supplies, equipment of intrinsically low capacity, or other physical limitations for expansion, would have little hope of achieving sufficient improvement in profitability to justify major investment in further optimization and pollution abatement programs. Such mills may continue to operate for a number of years, but are the most vulnerable during periods of economic recession.

* Optimization is the process whereby incremental capacity and greater efficiency are obtained through modernization activities such as equipment rebuild, incorporation of new technology and the improved balance between the various mill components.

Increasing consideration has been given to smaller scale pulping operations that would bring the massive capital and wood requirements of current operations to more manageable proportions. There is also a need for plants that could utilize isolated stands of wood resources which are not large enough to support a major mill. One suggested alternative is thermo-mechanical pulp (TMP). A minimum economic sized TMP mill is in the order of 250 tons a day at a capital cost of \$25 million or about one-third of the cost per annual ton of a kraft mill.

TMP, although an improvement over other mechanical pulps, is a coarse fibred pulp, inferior in strength, texture and brightness compared with chemical pulps and can only be partly substituted for them. Its chief use is in newsprint and other mechanical pulp based papers and boards. As nearly all mechanical pulp used is produced in mills integrated with paper and paperboard operations, the non-captive market for TMP is small, uncertain and subject to large price fluctuations. The interest in the TMP process has been due mainly to the possibility that eventually it may be able to economically eliminate or greatly reduce the need for chemical pulp in newsprint and thereby avoid major capital expenditure for pollution abatement. In addition to questions concerning markets and pulp quality, the TMP process must be carefully viewed in terms of required power and operating costs relative to other processes.

However, TMP is finding increasing use in newsprint and other mechanical pulp based papers and paperboards as a means of adding to existing production. The last worldwide survey indicated that about four million tons capacity per year is to be installed or is on order for the end of 1977. About 70 percent of installed capacity is in the U.S., Sweden and Canada. The U.S. leads with an estimated 900,000 tons per year followed by Sweden with 880,000 and Canada at 800,000. While in Canada most of the TMP application is in newsprint productions, e.g., 11 of 12 installations, extensive use of TMP in other countries is to be made in the production of other low cost mechanical pulp based paper and paperboards.

Production and Market Trends -- In both Canadian and world terms, the major percentage of wood pulp production is used domestically in integrated paper manufacturing facilities. Only 15 percent of world pulp output is traded internationally and Canada is the major supplier accounting for about 33 percent of world trade, followed by Sweden (26 percent). Approximately half of Canadian market pulp originates in British Columbia and is mainly in the kraft grades.

As illustrated in Table 24, Canadian pulp exports have increased from 3.3 million tons in 1963 to 7.3 million in 1978. This export tonnage represents 35 percent of total pulp production. Kraft wood pulp exports in the same period increased from 1.9 million to 6.1 million tons, representing 64 percent of production. The high volume of pulp exports has been possible because of duty-free entry into most world markets.

TABLE 24

CANADIAN WOOD PULP

PRODUCTION, CAPACITY, OPERATING RATIO'S, EXPORTS AND PRICES, 1955 to 1976

| TOTAL WOOD PULP | | | | | SULPHATE WOOD PULP (KRAFT) | | | | | Average Value per ton bleached sulphate to U.S. (U.S. \$) |
|---------------------------|-------------------------|--------------------|------------------------|---------------------------|----------------------------|--------------------|------------------------|-------|-----|--|
| Production ('000 tons) | Capacity ('000 tons) | Operating Ratio | Exports ('000 tons) | Production ('000 tons) | Capacity ('000 tons) | Operating Ratio | Exports ('000 tons) | | | |
| (percent) | | | | (percent) | | | | | | |
| 1955 | 10,151 | 10,830 | 94 | 2,336 | 1,471 | 1,473 | 100 | 892 | 139 | |
| 1956 | 10,734 | 11,319 | 95 | 2,374 | 1,597 | 1,677 | 95 | 916 | 143 | |
| 1957 | 10,425 | 12,198 | 85 | 2,283 | 1,706 | 2,042 | 84 | 1,016 | 145 | |
| 1958 | 10,137 | 13,044 | 78 | 2,219 | 1,896 | 2,349 | 81 | 1,149 | 144 | |
| 1959 | 10,832 | 13,073 | 83 | 2,450 | 2,234 | 2,339 | 96 | 1,376 | 145 | |
| 1960 | 11,461 | 13,185 | 87 | 2,602 | 2,442 | 2,490 | 98 | 1,466 | 141 | |
| 1961 | 11,779 | 13,602 | 87 | 2,869 | 2,697 | 2,908 | 93 | 1,635 | 132 | |
| 1962 | 12,133 | 14,146 | 86 | 3,045 | 2,926 | 3,101 | 94 | 1,681 | 128 | |
| 1963 | 12,474 | 14,662 | 85 | 3,340 | 3,136 | 3,329 | 94 | 1,883 | 128 | |
| 1964 | 13,742 | 15,446 | 89 | 3,636 | 3,420 | 3,779 | 91 | 2,018 | 136 | |
| 1965 | 14,573 | 16,215 | 90 | 3,853 | 3,904 | 4,217 | 93 | 2,245 | 137 | |
| 1966 | 15,958 | 17,488 | 91 | 4,096 | 4,605 | 5,141 | 90 | 2,615 | 134 | |
| 1967 | 15,857 | 18,981 | 84 | 4,269 | 5,068 | 6,283 | 81 | 2,966 | 130 | |
| 1968 | 16,762 | 20,079 | 83 | 4,971 | 6,034 | 7,251 | 83 | 3,742 | 125 | |
| 1969 | 18,590 | 21,441 | 87 | 5,795 | 6,945 | 7,819 | 89 | 4,503 | 128 | |
| 1970 | 18,308 | 21,680 | 84 | 5,581 | 6,707 | 7,887 | 85 | 4,290 | 141 | |
| 1971 | 18,234 | 22,844 | 80 | 5,671 | 7,132 | 8,545 | 83 | 4,529 | 143 | |
| 1972 | 19,239 | 22,620 | 85 | 6,102 | 7,889 | 8,705 | 91 | 4,988 | 138 | |
| 1973 | 20,462 | 23,608 | 87 | 6,546 | 8,893 | 9,605 | 93 | 5,486 | 169 | |
| 1974 | 21,518 | 24,810 | 87 | 7,097 | 9,139 | 10,310 | 89 | 5,788 | 276 | |
| 1975* | 16,659 | 24,614 | 68 | 5,513 | 7,050 | 10,428 | 68 | 4,609 | 354 | |
| 1976* | 19,390 | 25,185 | 77 | 6,739 | 8,761 | 10,510 | 83 | 5,593 | 349 | |
| 1977 | 19,591 | 25,187 | 78 | 6,715 | 8,989 | 10,622 | 85 | 5,556 | 333 | |
| 1978 | 21,182 | 25,057 | 85 | 7,317 | 9,575 | 10,618 | 90 | 6,113 | - | |

Source: Canadian Pulp and Paper Association and Statistics Canada

* 1975 and 1976 abnormal due to labour problems.

Although Canada is the world's second largest producer of pulp and the largest single exporter, Canadian mills are marginal suppliers to world markets, particularly in comparison to domestic production in the United States and Japan. Imports from Canada represent a relatively minor share of total pulp consumption and Canadian firms are price takers in these markets. While a significant proportion of Canadian exports of pulp are sold on a long-term contractual basis, prices at any given time generally reflect current market conditions depending on the terms of individual contractual agreements. Prices and volumes of spot tonnage sales are more sensitive to prevailing market conditions and, hence, tend to be more volatile over the market cycle.

While there has been considerable variation in the operating ratios of pulp producers over the last two decades depending on the balance of demand and installed capacity at any given time, operating ratios in Canada have remained considerably below those prevailing in the United States. This problem is compounded by the fact that pulp supply from Canadian mills to the United States is often the first to be cut back during market downturns.

The average values of Canadian bleached sulphate pulp sold in the U.S. indicated in Table 24 are based on list prices and, therefore, do not fully reflect the wide variations in the prices of spot tonnage or the discounting that may take place in periods of low demand, particularly by marginal pulp suppliers. These prices, however, are considered a good indication of general price movements over the time period under consideration.

Prices of sulphate pulp remained relatively constant through the 1960s and early 1970s due in large part to the major growth in pulp capacity in both Canada and the U.S. Production costs also remained comparatively stable over this period. In contrast, pulp prices more than doubled between 1972 and 1975. This can be attributed to a number of inter-related factors but mainly due to a sharp pickup in demand in 1973 and 1974 and a depressed rate of growth in new capacity during the early 1970s. There was also a considerable amount of speculative activity based on anticipation of supply shortages in 1974, bidding up prices even further. On the cost side, there was a rapid increase in the prices of virtually all factor inputs and particularly in the capital cost per ton of new capacity.

Demand fell off sharply in the latter part of 1974 and has only in 1978 recovered to its previous levels. Producers in North America attempted in the 1975-76 period to maintain their price levels despite this fall in demand. This resulted in production curtailments and short-term mill shutdowns. There was considerable uncertainty over the anticipated length and severity of the market downturn and many producers felt that it would be short in duration. Moreover, costs of

production continued to rise rapidly and many producers were reluctant to see their profit margins suffer further erosion. In contrast to the North American situation, producers in Scandinavia maintained their operating ratios with a subsequent buildup in inventories which created a depressing factor in world pulp markets for the next several years.

While prices were maintained at an abnormally high level relative to market demand, at least for a short period in 1975, they dropped sharply in 1976 and 1977 as a result of the competitive nature of the marketplace. Pulp prices in 1978 were not sufficient to justify investment in new capacity and this, combined with the increased prices of other factor inputs, will put an upward pressure on pulp prices over the longer term to more closely approximate the cost of production.

While Canadian pulp exports have increased, the Scandinavian countries' share of world pulp trade declined from 52 percent in 1963 to 40 percent in 1973, reflecting their policy to upgrade the level of domestic processing prior to export. This policy was supported by tariff concessions between the EFTA and EEC groups of nations. Recognizing that the Scandinavian countries are reaching the upper limit of resource utilization on a sustained yield basis, this policy of maximizing value added and thus employment is expected to receive increasing priority in the future.

Consequently, Canada should be in a position to continue to increase its share of world pulp markets over the medium term. However, over the very long term, opportunities should develop for increasing the export of paper and paperboard products from Canada.

Canada's largest market is and will probably continue to be the United States which in 1976 consumed more than 50 percent of our exports. The EEC should continue in a strong second position (33 percent). Asia, including Japan, has been a significant market in the past (12 percent), but with Japan's large purchase of chips overseas and the construction of pulp mills in Southeast Asia, New Zealand and Brazil, it is unlikely exports to Asia will increase dramatically before 1985.

NEWSPRINT

Key Points

- From 1963 to 1976, Canadian ownership of the domestic newsprint capacity has ranged between 57 percent and 59 percent. Participation by newspaper publishers has increased from 8 percent to 12 percent.
- Although Canada has maintained its dominance in world production of newsprint and hence as a supplier to world markets, its share of production has dropped from 55 percent in 1950 to 38 percent in 1976.
- In Eastern Canada, many newsprint mills are integrated with sulfite pulping. Such mills face significant problems due to the high cost of pollution abatement in sulfite pulp mills if conventional sulfite pulping processes are retained.
- New mechanical pulping processes, such as thermo-mechanical and chemi-mechanical, hold some promise for a substantial reduction in the chemical pulp content of newsprint.
- The establishment of a newsprint mill based entirely on recycled waste newspapers is not yet possible in Canada due to the dispersion of major urban centres. Newsprint mills entirely or partially based on recycled newspapers currently exist in the United States and are well advanced in Europe and Japan.
- The bulk of Canadian production originates in world scale mills. However, some of the equipment is not up to present day standards.

Industry Size and Structure -- Newsprint is used almost exclusively in the publication of newspapers and is the largest single paper product of the Canadian pulp and paper industry.

The majority of newsprint is produced in basic weights from 28 to 35 pounds per 3,000 square feet. Currently 90 percent of Canadian tonnage is in the 30 pound range down from 32 pounds a few years ago.

In 1976, the Canadian newsprint industry consisted of 21 companies with 43 mills and produced 8.9 million tons of newsprint, representing 36 percent of total world production. Of the 21 companies, 10 also have newsprint facilities in other countries. Overall, the distribution of ownership of Canadian newsprint capacity during the period 1963-1976 has remained fairly stable. However, there has been a steady increase in the percentage of publisher influenced or controlled capacity.

TABLE 25

Ownership of Canadian Newsprint Capacity (estimates)

(percent)

| | <u>1963</u> | <u>1968</u> | <u>1973</u> | <u>1976</u> |
|---------------------------------------|-------------|-------------|-------------|-------------|
| Canadian | 58 | 59 | 57 | 57 |
| Foreign | <u>42</u> | <u>41</u> | <u>43</u> | <u>43</u> |
| | 100 | 100 | 100 | 100 |
| Publisher influenced or controlled | 8 | 10 | 11 | 12 |

Source: Department of Industry, Trade and Commerce.

Due to the marginal nature of the Canadian supply in export markets, the Canadian-owned companies that account for 57 percent of capacity are usually the first to lose volume in a period of declining demand, while the publisher-owned mills are the least affected. Foreign-controlled subsidiaries may suffer somewhat, but only if the parent has mills of its own in other countries which it prefers to keep in operation.

Most of the pulp used in the manufacture of newsprint is essentially mechanical pulp which is supplemented with some chemical pulp to improve the paper strength properties. The 39 newsprint mills in Canada are integrated with production of mechanical pulp and 33 also have chemical pulp capacity, either sulfite or kraft. The remainder rely on outside purchases of chemical pulp. There are 27 newsprint mills integrated with sulfite pulp. All are located in Eastern Canada and those that choose to continue using conventional sulfite pulping could be adversely affected by the unresolved pollution problems associated with the sulfite process.

The newsprint industry worldwide is taking steps to reduce the amount of chemical pulp used in the furnish. New types of mechanical pulp, such as thermo-mechanical pulp (TMP), hold considerable promise and as indicated earlier several new TMP installations are currently in operation worldwide.

In the U.S., Western Europe and Japan, recycled waste newspapers are used in the manufacture of newsprint. It is generally agreed that there are several areas in the United States with populations in excess of 10 million that could support newsprint mills based on recycled waste newspapers. Newsprint mills are already established in three such areas. To date, very little waste newspaper is being recycled into newsprint in Canada due to the dispersion of major urban centres resulting in prohibitive collection and transportation costs to support an economic scale operation. The bulk of the waste papers, including waste newspapers, used in Canada goes into packaging and construction grades.

Capacity -- In 1973, the annual productive Canadian capacity was about 10.4 million tons, an increase of 29 percent over 1963. Between 1973 and 1977, it has remained unchanged as there has been a substantial drop in basis weight.* Capacity is concentrated primarily in Ontario and Quebec as indicated in Table 26.

TABLE 26

Canadian Newsprint Capacity

| | <u>1963</u> | | <u>1968</u> | | <u>1973</u> | | <u>1977</u> | |
|--------------------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|
| | '000 | | '000 | | '000 | | '000 | |
| | <u>tons</u> | <u>%</u> | <u>tons</u> | <u>%</u> | <u>tons</u> | <u>%</u> | <u>tons</u> | <u>%</u> |
| Quebec | 3,662 | 46 | 4,330 | 45 | 4,692 | 45 | 4,800 | 48 |
| Ontario/Manitoba | 2,117 | 26 | 2,331 | 24 | 2,317 | 22 | 2,120 | 21 |
| British Columbia | 1,197 | 15 | 1,645 | 17 | 1,608 | 16 | 1,530 | 15 |
| Atlantic Provinces | 1,078 | 13 | 1,349 | 14 | 1,720 | 17 | 1,550 | 16 |
| TOTAL | 8,054 | 100 | 9,655 | 100 | 10,337 | 100 | 10,000 | 100 |

Source: Canadian Pulp and Paper Association

World newsprint capacity is located largely in Canada, the United States and Scandinavia which together account for about two-thirds of the world total.

* Basis weight is the measure of the weight per unit area of newsprint. Therefore, at the same tonnage capacity, a shift to a lower basis weight results in a greater sheet area of newsprint.

TABLE 27

World Newsprint Capacity

| | <u>1963</u> | | <u>1968</u> | | <u>1973</u> | | <u>1977</u> | |
|---------------|---------------------|-----------|---------------------|-----------|---------------------|-----------|---------------------|-----------|
| | '000 <u>tons</u> | % | '000 <u>tons</u> | % | '000 <u>tons</u> | % | '000 <u>tons</u> | % |
| Canada | 8,054 | 41 | 9,655 | 40 | 10,337 | 39 | 10,000 | 36 |
| United States | 2,461 | 12 | 3,424 | 14 | 3,819 | 14 | 4,150 | 15 |
| Scandinavia | 2,655 | 14 | 3,274 | 14 | 3,625 | 14 | 3,869 | 14 |
| Other Western | | | | | | | | |
| Europe | 2,979 | 15 | 3,032 | 13 | 2,880 | 11 | 2,811 | 10 |
| Other | <u>3,514</u> | <u>18</u> | <u>4,705</u> | <u>19</u> | <u>5,789</u> | <u>22</u> | <u>6,962</u> | <u>25</u> |
| TOTAL | 19,663 | 100 | 24,090 | 100 | 26,450 | 100 | 27,792 | 100 |

Source: Canadian Pulp and Paper Association

Additions to world capacity between 1973 and 1977 are estimated at approximately 1.4 million tons or 5 percent of the 1973 capacity. Canada accounts for roughly 34 percent of this additional capacity, the United States, Japan and the rest of the world for 22 percent each.

Scale -- The bulk of Canadian newsprint capacity is in world scale mills. However, Canadian mills generally use a larger number of machines for comparable capacity than their counterparts in other major producing countries. Also in Eastern Canada, many machines are either approaching the limit of their economic life and cannot be economically modernized or have not yet been brought to optimum capacity.

TABLE 28

Canadian Newsprint Mills by Size Class (1977)

| <u>Annual Capacity</u> | <u>No. of Mills</u> | <u>Percent of Canadian Capacity</u> |
|-------------------------|---------------------|---|
| 300,000 tons and over | 12 | 46 |
| 200,000 to 300,000 tons | 13 | 33 |
| Under 200,000 tons | <u>14</u> | <u>21</u> |
| TOTAL | 39 | 100 |

Source: Department of Industry, Trade and Commerce

Economies of scale have been increasingly important in the production of newsprint to overcome rapidly increasing capital and manufacturing costs. The minimum economic size of a green field mill is currently in excess of 350,000 tons per year. Ten years ago, the cost of a mill of this size was \$75 million. The same mill in 1976 costs \$200 million, exclusive of forest land and infrastructure that can add considerably to this cost. The current high capital cost of new facilities is limiting further expansion. To counter this situation, additional capacity is currently made available mainly from optimization of existing facilities. Optimization is a process whereby incremental capacity and increased levels of efficiency are obtained through equipment rebuild, incorporation of new technology, improved balance between the various mill components and the like. The cost of optimization per annual ton of incremental capacity has been estimated to be from 50 to 65 percent of the cost for new facilities. In addition, optimization can result in increased productivity, lower manufacturing and infrastructure costs, improved energy usage and pollution control and extended mill viability.

Production and Market Trends -- Some 90 percent of Canadian newsprint production is exported. The U.S. accounts for about 80 percent of these exports followed by Europe and Latin America, each representing less than 10 percent. Table 29 shows the distribution of Canadian newsprint shipments to the major market regions.

TABLE 29
Distribution of Canadian Newsprint Shipments

| Destination | 1963 | | | 1977 | | |
|---------------|---------------|-----------------|-----------|---------------|-----------------|-----------|
| | Cdn. Ship. | Percent | | Cdn. Ship. | Percent | |
| | (M tons) | Cdn. Exports | Consumpt. | (M tons) | Cdn. Exports | Consumpt. |
| Canada | 523 | - | 100 | 909 | - | 100 |
| United States | 5,180 | 85 | 69 | 6,341 | 78 | 63 |
| Western | | | | | | |
| Europe | 482 | 8 | 11 | 692 | 9 | 14 |
| Latin America | | | | | | |
| and Caribbean | 245 | 4 | 34 | 659 | 8 | 49 |
| Japan | - | - | - | 8 | - | - |
| Other | 192 | 3 | 10 | 396 | 5 | 6 |
| TOTAL | 6,622 | 100 | | 9,005 | 100 | |

Source: Statistics Canada

While Canada currently supplies over 60 percent of U.S. consumption, this percentage has decreased steadily from the 70 percent market share held in the early 1960s due to major capacity increases in the

southern U.S. Five new machines are scheduled to come on stream in the U.S. South and Pacific Northwest by 1980 which will result in more than a 20 percent increase in U.S. production, further eroding Canada's market share in the U.S. In the European market, the Scandinavian suppliers tend to dominate. Indeed, Canada's share of Britain's imports dropped from about 60 percent in the early 60s to about 40 percent in the 1970s.

Table 30 presents trends in capacity, production, operating ratios, exports and list prices for the Canadian newsprint industry.

TABLE 30

Newsprint

Canadian Capacity, Production, Operating Ratio,
Exports and Prices, 1955-1976

| | Capacity | Production | Operating | Exports | Average Delivered List Prices at New York (U.S. \$) |
|------|----------|------------|-----------|----------|--|
| | ('000 T) | ('000 T) | (ratio %) | ('000 T) | |
| 1955 | 6,064 | 6,191 | 102 | 5,805 | 126.00 |
| 1956 | 6,247 | 6,469 | 104 | 5,972 | 130.00 |
| 1957 | 6,756 | 6,397 | 95 | 5,907 | 133.00 |
| 1958 | 7,239 | 6,096 | 84 | 5,609 | 134.00 |
| 1959 | 7,521 | 6,394 | 85 | 5,953 | 134.00 |
| 1960 | 7,611 | 6,739 | 89 | 6,265 | 134.00 |
| 1961 | 7,734 | 6,735 | 87 | 6,216 | 134.00 |
| 1962 | 7,844 | 6,691 | 85 | 6,169 | 134.00 |
| 1963 | 8,055 | 6,630 | 82 | 6,100 | 134.00 |
| 1974 | 8,274 | 7,301 | 88 | 6,759 | 134.00 |
| 1965 | 8,421 | 7,720 | 92 | 7,157 | 134.00 |
| 1966 | 8,878 | 8,419 | 95 | 7,764 | 136.92 |
| 1967 | 9,294 | 8,051 | 87 | 7,330 | 140.50 |
| 1968 | 9,655 | 8,031 | 83 | 7,422 | 142.00 |
| 1969 | 9,675 | 8,818 | 91 | 8,119 | 147.00 |
| 1970 | 9,845 | 8,719 | 89 | 7,988 | 152.00 |
| 1971 | 10,140 | 8,455 | 83 | 7,641 | 158.00 |
| 1972 | 10,300 | 8,820 | 86 | 8,120 | 164.58 |
| 1973 | 10,337 | 9,140 | 88 | 8,340 | 175.00 |
| 1974 | 10,038 | 9,548 | 95 | 8,711 | 210.00 |
| 1975 | 9,829 | 7,680 | 76 | 6,863 | 260.00 |
| 1976 | 9,921 | 8,906 | 90 | 7,713 | 282.50 |
| 1977 | 9,902 | 8,988 | 91 | 8,009 | 302.50 |
| 1978 | 9,861 | 9,713 | 98 | 8,673 | -- |

Source: Canadian Pulp and Paper Association and Statistics Canada.

Although Canadian production has been increasing since the 1950s, Canada's share of world production has declined from 55 percent in 1950 to about 38 percent in 1976. As in the case of market pulp, Canadian newsprint operating ratios also show considerable variation over this period due to market cycles. List prices were relatively stable during the 1950s and 1960s but have escalated rapidly during the 1970s reflecting major increases in production costs and a sharp pickup in demand in 1974. In 1975, demand fell off sharply resulting in production curtailments and low operating ratios. Widespread work stoppages in Canada during 1975 and the early part of 1976 also contributed to a historically low operating ratio. U.S. demand started to recover in 1976 and has been exceptionally strong in 1977 and 1978 resulting in firm prices and high operating ratios. Current prices are still not sufficient in most cases to justify investment in new facilities and most of the incremental capacity in Canada is expected to continue to come from upgrading existing facilities over the medium term. While market conditions are strong at the present time, there is considerable uncertainty over the Canadian industry's ability to maintain high operating ratios if the new U.S. capacity is accompanied by a downturn in the U.S. economy.

Moreover, variations in operating ratios and list prices only partially indicate the effects of cyclical demand and other factors on the industry. In periods of low demand, list prices may not represent the prevailing product price because of the wide scale discounting that takes place between buyers and sellers. In addition, variations in operating ratios between mills are far more significant depending on their ownership status than aggregated figures in the table would indicate.

In common with other Canadian pulp and paper industry sectors that must rely heavily on export markets, the newsprint industry is at a cost disadvantage compared with its major competitors in the U.S. with respect to wood, labour and transportation. Moreover, the U.S. mills are able to maintain higher operating rates because many of the Canadian mills tend to be marginal suppliers. The Canadian newsprint industry, on the other hand, shares with its competitors some degree of uncertainty concerning the future orientation of the newspaper publishing industry relative to such matters as basic weights, roll size, newspaper size and content, printing techniques, per capita consumption and share of markets for information dissemination. These factors have considerable impact on costs that must be incurred by the newsprint industry.

OTHER PAPER AND PAPERBOARDS

Key Points

- Paper and paperboard producers are primarily oriented towards the domestic market. International trade in these products is usually subject to significant tariff and non-tariff barriers.
- The packaging papers and boards sector is the largest in the category of other paper and paperboards with 68 percent of the total production and 70 percent of the total exports. Of the various grades, including kraft linerboard, corrugated medium, kraft papers and boxboard, only kraft linerboard could be classified as a possible worldwide export commodity item. The Canadian mills producing packaging papers and boards have a considerable range in scale of operations. Many do not have the economies of scale to be internationally competitive.
- Fine paper capacity is almost entirely Canadian owned. The industry is domestically oriented and imports have gained an increased share of the Canadian market, despite tariff barriers of 12 1/2 to 15 percent. Small manufacturing units and short production runs are adversely affecting the industry's competitive position. No new fine paper machines have been installed since 1968 and there have been no announcements on new capacity increases.
- The sanitary tissues industry is dominated by U.S. companies having 75 percent of total Canadian capacity. The Canadian subsidiaries, however, operate quite independently as complete entities in the domestic market.

This other paper and paperboard group consists of packaging papers and boards, printing and writing papers including fine papers and sanitary tissue. During 1976 some 70 mills produced 4.0 million tons of other paper and paperboard products or 21.4 percent of total production by the Canadian paper and board industry.

TABLE 31

Production of Other Paper and Paperboard*

('000 tons)

| | <u>Packaging Papers and Boards</u> | | <u>Printing and Writing**</u> | | <u>Sanitary Tissues</u> | | <u>Total</u> | |
|------|--|-----|-----------------------------------|-----|-----------------------------|-----|--------------|-----|
| | (tons) | (%) | (tons) | (%) | (tons) | (%) | (tons) | (%) |
| 1963 | 1,646 | 71 | 465 | 20 | 201 | 9 | 2,312 | 100 |
| 1968 | 2,243 | 71 | 674 | 21 | 254 | 8 | 3,171 | 100 |
| 1973 | 3,186 | 71 | 983 | 33 | 324 | 7 | 4,493 | 100 |
| 1976 | 2,761 | 68 | 958 | 24 | 327 | 8 | 4,046 | 100 |

Source: Canadian Pulp and Paper Association.

* Includes pulp fibre derived from waste paper.

** Includes groundwood printing, specialty, book, fine, and miscellaneous fine writing papers.

TABLE 32

Exports of Other Paper and Paperboard*

('000 tons)

| | <u>Packaging Papers and Boards</u> | | <u>Printing and Writing**</u> | | <u>Sanitary Tissues</u> | | <u>Total</u> | |
|------|--|-----|-----------------------------------|-----|-----------------------------|-----|--------------|-----|
| | (tons) | (%) | (tons) | (%) | (tons) | (%) | (tons) | (%) |
| 1968 | 374 | 76 | 169 | 22 | 18 | 2 | 562 | 100 |
| 1973 | 787 | 67 | 363 | 31 | 20 | 2 | 1,170 | 100 |
| 1976 | 656 | 71 | 272 | 29 | 5 | - | 933 | 100 |

Source: Canadian Pulp and Paper Association

* Includes pulp fibre derived from waste paper.

** Includes groundwood printing, specialty, book, fine and miscellaneous fine writing papers. Groundwood printing exports were 51,000 tons in 1968, 184,000 tons in 1973 and 134,000 tons in 1976.

Exports of other paper and paperboard in 1976 represented close to one million tons or about 7 percent of all exports by the pulp and paper industry.

The other paper and paperboard industry evolved in Canada to service a domestic need. Principal markets apart from Canada are the United States (50 percent of total exports) and Britain (18 percent); a large and changing number of countries receive the balance. According to FAO data, world demand for these products increased by an average of about 6 percent a year between 1950 and 1970.

Unlike wood pulp and newsprint which are characterized by a general absence of trade barriers, fine papers, packaging papers and paperboards and sanitary papers are manufactured under tariff protection in most countries. With the exception of kraft linerboard these grades tend to be produced close to market and are made with a larger percentage of waste paper as a raw material, especially in Japan and Western Europe.

For the group as a whole, about 12 percent of world requirements is supplied through international trade, but Canada is not a major participant in this trade, accounting for about 7 percent of the total. Finland and Sweden are important suppliers. In linerboard, the United States industry has the lowest cost structure and the leading export position.

Packaging Papers and Boards

This category includes the component paper and board materials, i.e., linerboard, corrugated medium, kraft papers and boxboard, which are used in the manufacture of consumer and industrial packaging (paper bags, boxes, corrugated cases, etc.).

Linerboard

Product Description and Industry Structure -- Most Canadian linerboard (kraft linerboard) is produced from 85 percent or more virgin pulp on fourdrinier or cylinder machines. The balance of production comes largely from secondary or recycled fibre. Linerboard used as the facing material for corrugated and solid fibre shipping containers is classified according to the furnish (i.e., the kind of fibre used) and the method of web formation, such as fourdrinier linerboard or jute (waste papers) linerboard.

During 1976, Canadian production of linerboard was some one million tons with unbleached kraft linerboard accounting for an estimated 90 percent of production. The eight unbleached kraft linerboard mills which are located across Canada have production capacities ranging from 3,200 tons to 350,000 tons per annum. More than 70 percent of production is sold to the domestic market, primarily to integrated operations, with the remaining 30 percent sold offshore. The linerboard mills employ between 4,000 and 5,000 workers. About 70 percent of capacity is integrated with pulp production. Two mills, one located in Eastern Canada and the other in Western Canada, are market linerboard mills, while the others supply products to divisions within their own corporation, to some captive overseas operations and to some market customers. The eastern mill, located in Newfoundland, was recently shut down and is currently undergoing a conversion to newsprint.

Any economies of scale in the production of Canadian market linerboard are offset by relatively high wood and other costs which result in an overall competitive disadvantage in world markets. This factor, coupled with very soft export prices, were responsible for the shutdown of the Newfoundland mill. Further to these problems, tariff barriers continue to be a constraint for increased market access of Canadian kraft linerboard.

World Markets -- Kraft linerboard is one of the few grades of packaging paper and board which could be classified as a worldwide export commodity item. During 1974, a peak year, worldwide exports of kraft linerboard reached 3.3 million tons.

TABLE 33

Exports of Kraft Liner by Major Supplying Countries

('000 short tons)

| | <u>1973</u> | <u>1974</u> | <u>1975</u> | <u>1976</u> | <u>1976 Percent Distribution</u> |
|---------------|-------------|-------------|-------------|-------------|--------------------------------------|
| United States | 1,646 | 1,743 | 1,224 | 1,419 | 51 |
| Sweden | 628 | 619 | 364 | 598 | 22 |
| Finland | 461 | 477 | 252 | 404 | 15 |
| Canada | 311 | 414 | 198 | 318 | 11 |
| Norway | <u>25</u> | <u>22</u> | <u>16</u> | <u>23</u> | <u>1</u> |
| TOTAL | 3,071 | 3,276 | 2,054 | 2,762 | 100 |

Source: American Paper Institute.

About 70 percent of kraft linerboard exported by the five supplying countries is shipped to Western Europe, mostly the EEC, which will continue to be Canada's major potential market. In 1976, about 78 percent of total Canadian kraft linerboard exports went to the EEC, accounting for approximately 10 percent of total EEC kraft linerboard imports.

Canada's major competitor is the U.S. which supplies about 40 percent of kraft linerboard imported by the EEC, 70 percent by the Middle East, 80 percent by the Far East, 80 percent by Africa and over 90 percent by Latin America.

Shipments of kraft linerboard to export markets are particularly sensitive to general worldwide economic and business conditions and are closely related to changes in the growth rates of the Gross National Product in the world consuming areas. Other factors affecting long-term growth rates of Canadian production include competition from substitutes, such as plastic products, improving transportation efficiencies through bulk and semi-bulk transport using containers or pallet boxes, and the increasing production of waste paper-based liner in export markets.

Corrugating Medium

Product Description and Industry Structure -- Corrugating medium is a low cost paperboard which is converted to form the corrugated or fluted member used in making container board, corrugated wrapping and similar products. It can be made from chemical or semi-chemical wood pulps, straw or reclaimed paper on cylinder or fourdrinier machines. Canada produces about 500,000 tons per year mainly in integrated mills with more than 75 percent of shipments sold domestically. All six Canadian mills, with the exception of one mill in New Brunswick, supply their own divisions or other captive domestic customers. Very limited tonnage is intended for export.

World Markets -- Relative to market chemical pulp, newsprint and kraft linerboard, world trade including Canadian exports of corrugating medium is limited. A low product value combined with a high transportation cost will continue to inhibit any appreciable increase in world exports.

TABLE 34

Exports of Corrugating Material by Major Supplying Countries

('000 short tons)

| | <u>1972</u> | <u>1973</u> | <u>1974</u> | <u>1975</u> | <u>1976</u> | <u>1976 Percent Distribution</u> |
|---------------|-------------|-------------|-------------|-------------|-------------|--------------------------------------|
| United States | 51 | 22 | 71 | 38 | 55 | 10 |
| Sweden | 245 | 266 | 244 | 140 | 186 | 34 |
| Finland | 319 | 333 | 314 | 160 | 178 | 32 |
| Canada | 147 | 140 | 96 | 53 | 90 | 16 |
| Norway | <u>53</u> | <u>49</u> | <u>53</u> | <u>24</u> | <u>41</u> | <u>8</u> |
| TOTAL | 817 | 811 | 780 | 415 | 550 | 100 |

Source: American Paper Institute.

Like kraft linerboard, the major export market for corrugating medium is in Western Europe (imports account for 65 percent of world trade). Sweden, Finland and Norway are major suppliers accounting for 98 percent of Western European imports and Canada's share has been less than 2 percent. Canada's export potential will be limited primarily to developing countries.

Kraft Papers

Production Description and Industry Structure -- Kraft papers include a wide variety of papers produced from kraft pulp (sulphate) usually having superior strength characteristics. The largest volume is sack kraft used exclusively in the manufacture of single and multi-wall sacks and bags for cement, sugar and other heavy duty applications. Sack kraft paper is usually manufactured close to the raw material source and is converted into end products close to the market.

Present annual Canadian capacity is approximately 360,000 tons of sack kraft and another 350,000 tons of all other types of kraft papers. With the exception of multi-wall sacks and bags (sack kraft), the 17 Canadian kraft paper mills sell almost entirely to domestic markets. Three mills, two in British Columbia and one in Manitoba, are modern operations and produce sack kraft for export.

World Markets -- The EEC is the major market for sack kraft, importing close to one million short tons. The major suppliers to the EEC are the Scandinavian countries accounting for more than 80 percent of total imports; Canada's export shipments are about 15 percent of the total. Canada's exports are mostly to the EEC and the U.S.

Future opportunities for Canadian export of sack kraft will continue to be the EEC, the Near and Middle East countries, Africa, and Southeast Asia. The United States will continue to utilize Canada only as a short-term incremental supplier. As with kraft liner, the long-term growth rate of sack kraft will coincide with GNP but will be affected fundamentally by competition from substitutes and the trend toward the bulk shipment of commodities.

Boxboards

Boxboards are made from wood pulp, waste paper, or a combination include folding, non-folding, solid bleached or other types and are available in plain, coloured and/or coated grades. They are used in numerous packaging applications from gifts to shoe and cereal boxes.

Total production in 1976 amounted to about 675,000 tons in both integrated and non-integrated mills located in the Maritimes, Quebec, Ontario and British Columbia. Exports are negligible. Furnish is largely waste paper and board with the exception of high quality bleached food board used for milk and solid food containers.

A very broad range of boxboard qualities and grades are produced in Canada with product line expansions tending toward new and better board coatings. In Canada, the degree of integration in the boxboard industry is negligible compared with the highly integrated and large scale U.S. industry which can compete with Canadian producers in Canada despite the tariff. From 1967 to 1976 boxboard imports from the U.S. as a percentage of Canadian consumption increased from 6 percent to 16 percent.

Printing and Writing Papers

This category includes groundwood printing and specialty paper (with more than 50 percent groundwood pulp content) and book, fine and miscellaneous fine writing papers (with 100 percent chemical wood pulp or very small groundwood content). Book, fine and miscellaneous fine papers are classified as fine papers by the definition used by CPPA which includes machine coated groundwood paper containing greater than 50 percent groundwood pulp.

Groundwood Printing and Specialties

The furnishes used are generally various combinations of bleached or unbleached chemical and/or mechanical pulp, but principally the latter. The heavy use of mechanical pulp (from 25 percent to 75 percent) instead of chemical pulp produces a cheaper paper but also facilitates the retention of loading materials and has the characteristics, such as higher bulk and opacity for equivalent basis weight and smooth finish, which are necessary for high-speed printing. These papers are less permanent and less bright than book papers made of all chemical furnish. Because the grade is so closely related to newsprint, most of it is produced and marketed by newsprint companies across Canada. It can be supplied coated or uncoated. Total production for catalogues, newspaper supplements, wallpaper hanging stock, etc., in 1976 was 384,000 tons with over 134,000 exported, principally to U.S. markets.

Book, Fine and Miscellaneous Fine Papers

Product Description and Industry Structure -- This paper group, also referred to as fine papers, predominantly utilizes a high degree of chemical pulp content to meet more exacting specifications of strength, printability and durability. The exception in this group is machine coated groundwood paper greater than 50 percent groundwood pulp. Some of the less sophisticated grades are manufactured on newsprint type machinery but the bulk are produced by the six fine paper companies in Ontario, Quebec and British Columbia.

Major grades in this group are: book printing papers, lithograph and offset papers, coated papers, board and writing papers, envelope and duplicating papers. Also included are miscellaneous fine papers such as blotting papers, cup and food container stock, bristols tabulating card stock, as well as machine coated groundwood for magazines and periodicals, etc.

This 80 percent Canadian controlled industry is basically geared to service domestic needs. Canadian consumption of fine papers doubled in the 10 years prior to 1973 when it reached about 700,000 tons. Consumption in 1977 was 736,000 tons with production in the same year at 760,000 tons.

The Canadian fine paper industry was established in the mid to late 1800s to serve the needs of local business in Upper and Lower Canada. Canadian mill locations have changed since the 1800s but 97 percent of industry production is still grouped in Ontario and Quebec near large population centres. There is one mill in British Columbia. A high percentage of the United States fine paper producers is also located close to these large Canadian population centres and has taken an increased share of Canadian business, despite Canadian tariffs of between 12 and 15 percent.

The Canadian fine paper industry has special characteristics and serious problems that require the following detailed description.

There are six principal fine paper producers in Canada (13 mills) with several other companies producing small amounts of paper considered to be within the fine paper category. Although the industry's products represent only 2 to 4 percent of the tonnage output of the entire pulp and paper industry, the value of shipments amounts to about 10 percent of the total value of shipments of the entire industry. In addition, the industry employs more than 7,000 people or about 10 percent of the total pulp and paper industry workforce.

More than 80 percent of the Canadian pulp and paper industry's products (market pulp and newsprint) are considered to be commodities not protected by tariff. These products are destined for export and are produced in large volumes with long runs and few variations in specifications. By contrast, fine paper mills in Canada, like those in the rest of the world, have enjoyed substantial tariff protection. In Canada, over 300 grades are made to stringent specifications in low volumes which makes the end product costly compared with similar grades produced by the U.S. industry where, with a total capacity of 10 million tons, at least one paper company produces more fine paper than the entire Canadian industry. This fact alone suggests a serious need for some form of rationalization if the Canadian industry is to improve its competitive position vis-à-vis larger and more specialized U.S. producers.

Prior to the 1970's, the fine paper industry supplied 90 percent or more of the Canadian market on a reasonably profitable basis. As with newsprint and pulp, the fine paper industry benefited from the effects of devaluation during the early part of the 1960s; there was a decline in the share of the domestic market captured by imports and a strong upward movement in the volume of printing and writing paper exported at that time.

After 1968, imports started to move upwards as a result of reduced tariffs and increased domestic costs and by 1970 had reached 46,000 tons, twice the level at the beginning of the decade. This trend has continued with imports rising to 85,000 tons in 1973. Due to labour problems in the Canadian industry and an overcapacity situation in the U.S., imports from the U.S. jumped in 1976 to 238,000 tons. With the decreased value of the Canadian dollar in relation to the U.S. dollar and a strengthening in U.S. demand, the Canadian industry has been slowly regaining domestic markets lost in 1976 to U.S. imports.

During the 1960s, four fine paper machines were installed in Canada at a rate of one every two years. The most recent addition was by the E.B. Eddy Company in 1968. Since then, capacity increases have resulted from machine speed-ups or use of paper machines not previously utilized for fine paper production.

An analysis of costs made by the Department of Industry in 1968 in conjunction with the major companies demonstrated cost savings obtainable through rationalization. No action was taken by industry at the time because of concern about possible violation of the Combines Investigation Act. It is apparent that similar cost relationships still exist and rationalization of production and marketing among companies or through mergers may represent the only means to achieve major cost savings and improved competitiveness.

Other major constraints affecting the competitive ability of the fine paper industry are high wood costs, high labour costs and high transportation rates specifically into the U.S.

World Markets -- Canada has over the years maintained three principal export markets for fine papers: the United States, Britain and the West Indies-Central American area. Australia and South Africa have been stable markets until recently, but increased production by local mills and application of import controls have affected Canada's market share. The entry of Britain into the Common Market has also affected fine paper shipments to that country. During 1976, Canadian exports of fine paper to Britain had decreased by 6,000 tons, with about 3,000 tons going to other EEC countries. In the same year, about 75 percent of EEC imports of writing and printing grades of paper (fine papers and groundwood printing and specialties) were from Scandinavian countries. An additional constraint on increasing access to the EEC market is Canada's tariff disadvantage which by 1984 will be 12 percent vis-à-vis the Scandinavians. With the present structure of the industry, the major export opportunity for fine papers may be limited to volumes of specialty grades, principally to the United States.

Sanitary Tissues (Industrial and Consumer Paper Products)

Sanitary tissues include a group of papers used for sanitary disposal purposes. These papers are absorbent, bulky and often creped. Furnish is usually a combination of groundwood, bleached sulphate kraft and hardwood kraft pulp. Sanitary tissue products include toilet and facial tissues, paper towels, paper napkins, waxed paper, sanitary napkins and disposable diapers.

There are four major firms in the industry, accounting for 85 percent of mill capacity, and the remaining 15 percent is divided among three small companies. Four of the seven firms are foreign affiliates controlling approximately 75 percent of Canadian capacity.

This industry, in Canada and in other countries, serves domestic needs with only excess tonnage, in the form of semi-processed rolls, exported. In 1976 about 334,000 tons of tissue products were manufactured in Canada, but only 5,000 tons were exported. Canada's export markets are the developing countries, but gains have been limited because of the establishment there of production and converting facilities. High cost of ocean freight due to bulk also constrains trade.

The sanitary tissue industry produces consumer products, marketed through food industry distribution networks, and is therefore different from most other segments of the pulp and paper industry.

The large Canadian consumer markets are close to U.S. mill and converting facilities which have significant cost advantages through economies of scale and market size, lower wage structures, freight rates, and machine and equipment costs as well as advantages in marketing and research.

FURTHER MANUFACTURED PRODUCTS

MANUFACTURED WOOD PRODUCTS

Key Points

- The industry is fragmented in character with many small plants producing numerous products and characterized by simple production techniques. The operations tend to be labour intensive.
- While plants tend to be located near major urban centres to minimize transportation costs to market and to tap the accessible labour supply, many of the segments are regionally dispersed and often important to the economic stability of small communities.
- Tied to housebuilding activity, this industry is both cyclical and seasonal in nature. The renovation and do-it-yourself market will continue to eliminate a portion of the cyclical swings.
- A reduced demand for new houses over the next two decades will affect the growth and structure of many of the manufactured wood product sectors, particularly manufactured housing. Increased exports may help offset this adverse trend.
- Growing imports of certain products such as wood windows are viewed with concern by the industry. Exports of manufactured buildings, houses and components are at much higher levels than in the mid 1970s.
- The industry provides a large and accessible market for products of the primary wood manufacturers. The further manufacture of wood products prior to export has become part of the planning by industry and by various levels of government in their industrial development policies.
- The number of prefinished and ready-to-assemble products and building materials arriving on the building site is steadily increasing.
- A key concern of the millwork industry is securing a continuous supply of high quality raw material at reasonable prices.
- The mobile home sector has experienced serious overcapacity since the peak year of 1974. The image of the mobile home is improving because of the actions taken by governments, financial institutions and industry. However, there is much to be done before greater public acceptance is achieved.

- . The prefabricated housing industry is able to supply the wide range of low-rise dwellings demanded by the Canadian and foreign buyers. Market share in Canada has been increasing at the expense of on-site building.
- . The kitchen cabinet and vanity manufacturers, by selling to the renovation market, have kept production at relatively high levels, even through periods of low housebuilding activity.
- . The pallet, box and container industry has potential for growth in the medium term.
- . Hardwood flooring production is declining with the emerging customer preference for other floor coverings. Carpeting, vinyl, tile, and parquet flooring have taken a major share of the market.

Introduction

The manufactured wood products industry includes all establishments principally engaged in the further processing or utilization of primary wood products such as lumber and panel products. In 1976, the total value of shipments of this industry amounted to \$1,679 million with value added by manufacturing of \$685 million. It employed about 37,000 workers and paid over \$400 million in total wages and salaries. Exports totalled \$158 million, 43 percent of which were to the United States. Imports totalled \$112 million, approximately 82 percent from the United States, and accounted for approximately 7 percent of domestic consumption.

The industry consists primarily of firms engaged in the manufacture of millwork, mobile homes, prefabricated buildings and components, kitchen and bathroom cabinets and other wood products. Manufacturers are located in all 10 provinces, but like the Canadian population distribution, 80 percent of the industry is concentrated in Quebec, Ontario and British Columbia. Of the 1,352 establishments in operation in 1976, about 35 percent were located in Quebec, 32 percent in Ontario and 14 percent in British Columbia.

TABLE 35

Manufactured Wood Product Shipments, 1976

| | <u>\$ Million</u> | <u>Percent</u> | <u>Number of Employees</u> |
|---|-------------------|----------------|--------------------------------|
| Millwork, sash and door | 563 | 34 | 13,572 |
| Mobile homes | 260 | 15 | 3,200 (est) |
| Prefabricated buildings and components | 366 | 22 | 6,317 |
| Wooden kitchen cabinets | 140 | 8 | 4,331 |
| Pallets and containers | 111 | 7 | 3,430 |
| Miscellaneous wood products | <u>239</u> | <u>14</u> | <u>6,335</u> |
| TOTAL | 1,679 | 100 | 37,185 |

Source: Statistics Canada

Trends

Export and import trends for the total manufactured wood product sector are set forth in Table 36.

TABLE 36

Manufactured Wood Product Trends

| | (\$ million) | | | |
|------|----------------|----------------|------------------|---------------------------------|
| | <u>Exports</u> | <u>Imports</u> | <u>Shipments</u> | <u>Apparent Consumption</u> |
| 1970 | 56 | 32 | 550 | 526 |
| 1971 | 50 | 50 | 671 | 671 |
| 1972 | 60 | 63 | 850 | 853 |
| 1973 | 77 | 80 | 1,109 | 1,112 |
| 1974 | 85 | 105 | 1,362 | 1,382 |
| 1975 | 86 | 101 | 1,507 | 1,522 |
| 1976 | 158 | 112 | 1,679 | 1,633 |
| 1977 | 226 | 122 | -- | -- |

Source: Statistics Canada

While total imports have increased more or less in proportion to Canadian consumption, there have been quite rapid increases in the importation of certain products such as wood windows and window components. Increased exports over the last several years are mainly attributed to offshore sales of prefabricated buildings and components.

Since the bulk of manufactured wood products are used in housing, future trends in house construction will significantly affect the growth and structure of these industry sectors. Recent forecasts indicate a reduced demand in Canada and the U.S. for residential housing over the next 25-year period. This will put added pressure on Canadian industries, such as millwork and manufactured housing, to remain profitable.

There are several other factors and trends which are significant for the future of these industry sectors. For example, larger resource-based companies are increasingly engaged in further manufacturing or upgrading of primary wood products. A few have already integrated into this area and study by others is under way. Recognition of the potential benefits from diversification and profit growth are two of the underlying reasons.

In addition, the federal and some provincial governments are encouraging the further manufacture or upgrading of natural resources prior to export. While it is apparent that upgraded products must be competitive in both domestic and export markets, the evolution to further processing will likely continue.

Another trend which has had a positive effect on this industry segment is the steady increase in the number of prefinished and ready-to-assemble products and building materials arriving on the building site. This has resulted in the transfer of on-site labour costs into factory production costs. The total effect has been that direct labour costs in the low-rise residential construction sector have decreased over the last few years.

Export Markets

In 1977, exports from the total manufactured wood products sector reached \$226 million, up substantially from the \$56 million in 1970 and the \$86 million in 1975. The substantial growth that took place in 1976 and 1977 was primarily in the industrialized building sector, which includes manufactured housing.

Export markets for prefabricated housing and buildings probably offer the best solution to the problem of excess capacity in that industry during winter slowdown periods. However, there continue to be constraints including high transportation costs, building codes and standards which are not compatible with Canadian products and, in many markets, significant tariff barriers.

Canadian producers of a range of manufactured wood products have investigated the United States and offshore markets, often with encouraging results. Sales of Canadian manufactured houses have been made to many parts of the world, particularly to countries in the Middle East and North Africa. These developments have followed a number of years of intensive marketing effort by pioneering Canadian companies.

Moreover, there is potential for continuing export sales in both the developed and developing regions. In addition, markets for relocatable hospitals, camps, clinics, and schools exist in many developing countries. Purchases of manufactured housing units in developing countries, particularly for emergency use, are often supported financially by international aid organizations and foreign governments.

Export sales through a consortium created with departmental assistance have been achieved in New Guinea and Saudi Arabia, and the feasibility of forming additional export consortia have been considered by other Canadian companies. These consortia can assist firms to supply large export orders by economically combining the production of several plants.

Other exports from the manufactured wood product sector include exterior and louvered doors, windows, prefabricated fences and wooden handles. Exports of Canadian flooring, mainly to Britain, has declined along with Canadian production.

In summary, total exports from the Canadian manufactured wood products industry have increased significantly since 1970. Efforts to develop potential export opportunities should be continued, since a growing level of exports will considerably strengthen the overall industrial base of Canada's manufactured wood products sector.

Millwork

Millwork establishments manufacture a wide variety of products including windows, doors, moulding and trim. This industry accounted for \$563 million or 34 percent of the sector's value of shipments in 1976. Value added was \$246 million or 44 percent of the value of shipments.

In 1976, the value of exports was about \$30 million. There were a reported 619 millwork establishments with a total employment of 13,572, accounting for 36 percent of the manufactured wood product sector's work force. Much of the industry tends to be fragmented with small plants producing numerous products.

According to a recently completed private study, this industry sector is an important employer in the forest product industry. To convert a cunit of wood to the finished product these secondary industries use 15 times the manhours of the sawmill industry and four times the manhours of the plywood industry.

The millwork industry has recorded an annual production growth of about 8 percent over the last decade. It is unlikely that this rate can be substantially increased since production is geared almost exclusively to the domestic market. Many products of this sector are bulky or fragile and too expensive to ship over a great distance. Transportation costs and breakage have typically restricted market expansion beyond regional or provincial boundaries. Regional economic strength is important to the success and development of individual companies. Tied to housing starts, this industry is both cyclical and seasonal in nature.

The more recently established window and door plants located near major markets are often assembly operations, which transfer components from a central manufacturing operation or import them from the United States for assembly. Large U.S. window manufacturers have licensing or distribution agreements with Canadian firms.

Products are marketed in many different ways in the industry. These include building supply outlets, contractors and developers, department stores and hardware catalogue sales. Product lines are varied and compete with equivalent products made of plastic, aluminum and steel.

Trends within the industry include rationalization of production and marketing operations to reduce costs and improve profits, prefinishing to achieve greater use of lower grade and cheaper raw materials, and a growing interest in export sales.

In a recent Delphi Study,* undertaken for the Department of Industry, Trade and Commerce, a consensus was reached on projected trends for the use of wood in several individual products within this sector. For example, the panelists felt that the use of wood doors on a per dwelling basis will decline. Factors contributing to this conclusion include a reduction in the number of interior doors, increases in the number of archways and room dividers and the further acceptance and preference for exterior faced insulated steel doors. In addition, panelists anticipated that developments in the particleboard industry and the technology of reconstituting waste wood into usable product will result in better doors. These developments will occur in tandem with better finishing techniques for doors and door sets.

The same panelists felt that there would be no significant shift in the use of wood in windows over the next 15 years. The growing acceptance of vinyl-clad wood, wood's superior insulating qualities and a trend to double and triple-glazed windows using a wood-based frame core were cited as positive factors. The trend to smaller windows to reduce heat loss and a decrease in the number of windows per dwelling as the size of the dwellings decrease were pointed out as negative factors affecting the use of wood windows.

All of the Delphi Study panelists agreed that the use of wood moulding and trim would decline significantly over the next 15 years. The substitution of plastic, the potential elimination of base-board in lower-cost housing, the smaller average dwelling unit size and maintenance requirements were listed as causative factors. It was also agreed that foamed plastic moulding would be the dominant substitute material. It should be pointed out that a number of firms in Eastern Canada engaged in the manufacture of mouldings are facing closure due to pressure from imports and from substitute materials.

* Technological Developments That May Face the Housing and Wood Building Component Industries to the Year 1990

A major issue facing the millwork industry is the difficulty in obtaining adequate, high quality wood material at reasonable cost. In Canada, softwood species are used almost exclusively for windows and doors. Ponderosa Pine, which is available in commercial quantities from the Western United States, is the preferred species particularly with the declining availability of clear and shop grades of lumber from such commercially available Canadian species as White Pine, Western Red Cedar, Pacific Hemlock and Douglas Fir. Unfortunately, the availability of large quantities of quality Ponderosa Pine is also diminishing and there is an estimated 25 percent wastage factor in the average shipment to Canadian mills. Increased lumber prices have put pressure on profit margins in the millwork industry, and the continuity of raw material supply depends to some extent on the requirements of the U.S. millwork industry which has a purchasing advantage because of its size and location.

Another industry concern relates to a rapidly increasing volume of imports of certain millwork products. The American window industry, with its high production capacity from large-scale plants, and the low-cost Southeast Asia door manufacturers have recently increased their exports into Canada over a relatively high tariff. If this trend continues, some firms in certain sectors of the industry may be forced eventually to cease manufacturing and become distributors for foreign firms.

Mobile Homes

A mobile home is a movable or portable dwelling constructed to be towed on its own chassis, connected to utilities and located with or without permanent foundation for year-round living. Two or more mobile homes can be joined at the site to make up a single unit.

The total value of factory shipments in 1976 was \$260 million with value added by the manufacturing activity of only about 25 percent of shipments. The low value added is due to the fact that this industry is an assembly-line manufacturing operation that purchases the majority of its components from outside suppliers.

Plants are located near major urban areas to minimize transportation costs to market and to take advantage of an existing large labour force.

This industry is the most advanced of the further manufactured wood products segment from the points of view of rationalization of markets and production, and management expertise. There are ten major firms, each having at least three large manufacturing operations across Canada. Mobile home manufacturers market their product up to 1,000 miles from the plant with units marketed primarily through commission dealers with display areas or mobile home courts. While product lines are similar in overall appearance, competing firms use innovative exterior design or choice of materials as prime marketing features to attract buyers.

There are about 750 dealers (each representing several manufacturers) which purchase the units from the manufacturer and, using a variety of financial arrangements, retail the unit to the consumer. The dealer often arranges the purchaser's financing, transportation, and connection of the unit. He often builds and obtains approval for mobile home parks.

Low initial cost and basic market requirements resulted in this industry recording a 12-fold increase in volume of shipments during the period 1964 to 1973, while the value of these shipments increased 21-fold. In 1974, production increased another 12 percent. However, the economic downturn during 1975 severely affected markets and caused a significant decline in production. The industry has recently been operating at less than 50 percent of one-shift capacity. The result is excessively high per unit fixed costs and there have been a number of plant closures, primarily in the Atlantic provinces.

During 1974, the peak year, the Canadian industry employed more than 5,000 workers in 43 plants and built more than 28,000 mobile homes. This represented 13 percent of total Canadian housing starts and 21 percent of single family units. In 1976, mobile homes accounted for only 7 percent of the new housing market.

While industry spokesmen are optimistic that the situation will improve, there are significant constraints to a high level of growth. Difficulties in obtaining suitable sites for mobile home parks and in securing conventional mortgage financing are of concern. In addition, insurance premiums have increased significantly due to an apparent high risk of wind and fire damage. Concern persists among potential buyers and financiers about the safety aspect.

To increase production and utilize existing capacity, some firms have investigated export markets. However, there are some serious constraints to export, including a relatively efficient U.S. industry which has over capacity problems similar to those in Canada. Imported mobile homes from the U.S. have accounted for about 10 percent of the Canadian mobile home market.

One Canadian firm, a leader in the supply of relocatable type units to world markets and with four plants in North America, has experienced and publicly enumerated the labour and material cost advantages of producing in the U.S. A more favourable cost structure is a strong incentive for Canadian companies such as this one to shift production facilities to the United States to produce for the export market.

The Delphi Study panellists were divided in their estimates on shipments of mobile homes through to 1990. One group felt that the limited equity value, high depreciation, municipal restrictions and a continuing poor public image were restrictions to future growth. A second group felt that developments to extend the length of the mortgages for mobile homes, the ability to secure mortgages through conventional channels, the development of well-planned mobile home parks and changing municipal government attitudes would allow shipments to increase if these changes were to take place.

The growing acceptance of double and triple-wide units enables the mobile home manufacturers to compete directly with the sectional house manufacturer and the conventional builder. The mobile home will likely remain oriented towards particular regional markets in Canada and provide basic shelter requirements quickly and at a relatively low cost.

Manufactured Buildings and Components

A manufactured building consists of factory-produced components which account for about 50 percent of the material used above the foundation level. Products identified with this sector are pre-cut and assembled home components, panel component-built homes and modular or sectional homes.

In 1976 factory shipments were valued at \$366 million and value-added was \$137 million. The plants are often located close to the major urban centres where transportation costs to the market are minimized and unskilled and semi-skilled labour is available at reasonable cost. Total employment in 1976 was about 6,300. In general, these plants experience the cyclical economic pattern of the domestic building industry and winter plant slowdowns due to seasonal activity in this industry.

The prefabricated housing industry could, if required, supply the wide range of low-rise dwellings demanded by the Canadian consumer. Since 1967, production has increased at an average annual rate of about 11 percent. Market share has increased steadily, at the expense of on-site residential construction, and it is now estimated that about 30 to 40 percent of low-rise housing is factory built.

Modular housing producers will continue to compete with mobile homes for the lower cost housing market. A rationalization or amalgamation of these two industries is a strong possibility and may improve capacity utilization and lower per unit fixed costs if the number of plants are reduced in the process. On the other hand, the panel and pre-cut component industry will continue to penetrate the middle and high income housing market.

Prefabricated building and component firms market through local contractors, land developers, building supply houses as well as directly to consumers. Because of transportation costs, modular or sectional housing firms usually have markets restricted to a circle of 300-mile radius. Panel component and pre-cut packages, including vacation homes, are generally sold within a 500-mile radius of the plant. Model show homes are required as a marketing tool both in the domestic and the U.S. markets.

Canadian expertise in woodworking and timber-frame construction is well known and respected throughout the world. Canadian technology compares favorably with that in Scandinavia and the United States, the other major areas where forest products play a major role in the country's economic development. Utilizing basic skills and, for the most part, unsophisticated equipment, Canadian industry has demonstrated that it can compete in world markets, although the export marketing efforts by this industry sector started slowly and have only gained momentum in recent years. Markets are continuing to develop in the Middle East and a number of Canadian firms have shipped sizable volumes to that region. Canadian firms have also sold to countries in Europe, North Africa, Latin America and the Far East, as well as to the United States and Japan.

The Delphi Study respondents were asked to forecast the trends in low-rise industrialized housing in Canada. It was anticipated by most of the panelists that the component-built or two dimensional panel systems will make significant inroads during the next 15 years. This increase in market share will be at the expense of on-site house building which was forecast to decline from 63 percent to 39 percent over the same period. The modular or sectional house sector is also forecast to increase its share.

It must be pointed out that not all panelists agreed with the forecast. A few noted that, in Canada and the U.S., a number of companies that have attempted to set up industrialized systems have encountered difficulties. One reason cited was the inability to consolidate markets to realize continuous production and hence achieve economies of scale. It was further pointed out that the structure or shell of a low-rise residential dwelling unit accounts for only approximately 20 percent of the total cost of the dwelling unit to the purchaser. These panelists felt that the greatest potential for further development was in the area of standard components and sub-assemblies.

Another point of interest arising from the Delphi Study replies is that the application of technology is secondary to land assembly and control. The builder/developer, material, supplier or government body which has access to, and control of, land will ultimately determine the extent to which prefabricated construction techniques advance.

Kitchen Cabinet and Bathroom Vanities

The kitchen cabinet and vanity industry, despite the cycles involved in new housing construction, has grown rapidly since 1967, considerably faster than the millwork, sash and door industry. In 1976, a reported 219 cabinet plants produced about \$140 million worth of goods and employed 4,331. The majority of this production, however, is manufactured by about a dozen firms with sales, in 1976, from \$5 to more than \$15 million. Cyclical fluctuations have been modified somewhat in this industry by sales to the renovation market which, it is estimated, varies between 10 and 50 percent of total sales, depending on the province and/or the level of new housing starts.

The Delphi Study panelists indicated that they could not see a significant change in the volume of wood and wood-based material used, on a per dwelling basis, in kitchen cabinets and vanities. While plastics will be used increasingly in the industry, it is felt that wood composite and plastic laminate combinations will permit design flexibility and meet desirable maintenance standards. Storage walls to improve space utilization are becoming an important feature in both the new construction and the renovation market, and it is felt the kitchen cabinet manufacturers are in a good position to supply this product.

Most panelists agreed that modular, knock-down units are important to the industry, particularly to offset increasing shipping costs. This factor combined with increasing on-site labour costs is thought to assure a continuing high level of sales of factory prebuilt kitchen cabinets and vanities to the housing industry and renovation market. Prospects for this industry continue to be good.

Pallets, Boxes and Containers

The pallets, boxes and container industry in 1976 had a reported 166 establishments with shipments of \$111 million and a value added by manufacturing of \$53 million. The rate of growth for this industry between 1967 and 1975 was approximately 5 percent, equal to that experienced by all Canadian manufacturing industries. This regional industry services a broad cross-section of other industry sectors in Canada usually within 200 miles from the plant. The pallet sector is in all likelihood much larger than the statistics of reporting companies would indicate since firms outside this industry manufacture pallets to utilize low-grade lumber and also panel products.

In 1974-1975, reduced operating levels in all manufacturing sectors had a significant adverse impact on the industry. Despite these setbacks, the competitive nature of the packaging industry, and the new developments in material handling techniques and materials, the growth potential in the medium term is encouraging.

Flooring

In real terms, the hardwood flooring industry is declining. Thirteen plants in 1975, the last year for which separate statistics are available, reported shipments of \$13 million and produced a value added by manufacturing of \$6 million. Since 1967, shipments have decreased about 5 percent annually and this trend continues. The use of parquet flooring in commercial developments will continue to dominate the market. In addition, vinyl and vinyl asbestos, hardwood boards and ceramics have penetrated the market formerly served by hardwood flooring.

The Delphi Study respondents felt that there would be little or no change in the use of wood for flooring. Parquet flooring is expected to hold its share of the market. Several panellists were of the opinion that wood waste mixed with other materials as binders and hardeners would be more prominent in the flooring market in the future.

Miscellaneous Wood Products

These sectors, including plants manufacturing wooden handles, turnings and other wood products, have had varying degrees of difficulty in recent years. Some rationalization has taken place with the number of plants declining and employment per plant increasing. Value added in 1976 by manufacturing in these miscellaneous wood products sectors was \$106 million, accounting for 44 percent of shipments valued at \$239 million.

PAPER CONVERTING INDUSTRY

Key Points

- . The paper converting industry's products include corrugated containers, folding cartons, paper bags of all types and other paper products produced by coating, treating or cutting sheets or rolls of paper and paperboard.
- . The industry uses as its basic raw materials paper, paperboard and woodpulp frequently in combination with metallic foils and/or plastic coatings to create special-use laminates.
- . Vertical integration is not a dominant feature of the industry as a whole but it is prominent within the corrugated containers group and to a lesser degree in the paper bag group.
- . The industry, in the main, is domestically oriented serving highly localized markets from a large number of relatively small production plants.
- . Over the five-year period, 1972 to 1976, real growth approximated 2 percent per year while apparent growth in current dollars approximated 13 percent per year.
- . In the same period the total number of plants did not change significantly and the employment increase was modest at between 1 and 2 percent.
- . Little R&D is carried on in Canada within the converting industry and converting equipment used is almost all of U.S. or European design and manufacture.
- . The major export market for the industry is the U.S. but the volume is a negligible proportion of total industry shipments and growing slowly at roughly 6 percent per year. Imports, on the other hand, while not markedly significant in absolute terms at \$123 million are growing at about 17 percent per year and the trend is becoming a matter of concern to the industry.

This industry sector is a secondary manufacturing operation that uses paper, paperboard and woodpulp as its basic raw materials. In some cases these materials are combined with metallic foils and plastic coatings to create special-use laminates -- particularly for packaging applications.

In 1976 the value of industry shipments for paper based products (but excluding tissue products) amounted to \$1,890 million using materials valued at more than \$1 billion and creating a value added for manufacturing activity of about \$800 million. In that year the industry operated some 500 plants employing approximately 40,000 people.

The industry is made up of four major product groupings:

- Corrugated box manufacturing
- Folding and set-up box manufacturing
- Paper bag manufacturing
- Miscellaneous paper converting

TABLE 37

Corrugated Box Manufacturing

| | |
|---|---------------|
| Value of shipments | \$578 million |
| Value added -- (manufacturing activity) | \$224 million |
| Number of establishments | 88 |
| Number of employees | 7,833 |

Source: Statistics Canada

Corrugated products comprise the major segment of packaging materials and find their primary application in shipping containers for manufactured goods. These containers represent approximately 21 percent of the value of all containers used in manufacturing. In the five year period 1972-1976, little real growth (between 1 and 2 percent annually) occurred in container shipments, and the consumption of corrugated products was identical at 750 square feet per capita in the years 1972 and 1976. The value of shipments in current dollars, on the other hand, showed a high apparent growth that, because of the inflationary price effect, is misleading.

TABLE 38

Folding and Set-Up Box Manufacturing

| | |
|---|---------------|
| Value of shipments | \$350 million |
| Value added -- (manufacturing activity) | \$163 million |
| Number of establishments | 101 |
| Number of employees | 6,024 |

Source: Statistics Canada

Within this group a very wide range of miscellaneous packaging applications is to be found, although the emphasis is on consumer product packaging. Folding cartons and set-up boxes comprise the third ranked packaging container used by Canadian manufacturers after corrugated containers and metal cans. They occupy 13 percent of the total container usage of the manufacturing sector with the set-up box becoming progressively less in demand. In 1976 the set-up box formed less than 3 percent of total shipments by the industry.

Over the five year period 1972-1976 inclusive, real net growth has been small (1 to 2 percent yearly in the period) although the effect of inflation on value of shipments in current dollars has resulted in a growth of approximately 12 percent per year over the same period.

Over a longer term the trend has been downward for the number of plants in operation and the number of employees has decreased marginally in the period.

TABLE 39

Paper Bag Manufacturing
(Paper Based Products Only)

| | |
|---|---------------|
| Value of shipments | \$184 million |
| Value added -- (manufacturing activity) | \$ 68 million |
| Number of establishments | Not available |
| Number of employees | Not available |

Source: Statistics Canada

Part of a broader segment of packaging, often referred to as Flexible Packaging, the paper based product includes a wide range of bags of which the principal types are grocery bags, check stand bags and multiwall sacks. These three types account for approximately 65 percent of all paper bag shipments. In the context of the Canadian bag market the paper bag has, since 1967, steadily lost its share of

the market to the plastic bag and in 1976 the plastic bag captured 51 percent of the market. Imports continue on a steadily upward trend although their absolute value does not constitute a significant market share at this time. Exports, on the other hand, show only a marginal increase over the period 1972-1976 inclusive and are negligible in value.

The apparent growth in current dollars was about 10 percent per year as a result of substantial price increases. The overall growth in real terms over this period is zero and employment in the industry has declined.

TABLE 40

Miscellaneous Paper Converters

| | |
|---|---------------|
| Value of shipments | \$778 million |
| Value added -- (manufacturing activity) | \$343 million |
| Number of establishments | 215 |
| Number of employees | 11,473 |

Source: Statistics Canada

This industry comprises establishments primarily engaged in coating, treating, cutting, etc., in the conversion of paper and paperboard and the range of products converted is wide. Principal products of the industry are waxed papers, facial tissues, paper towels, toilet paper, envelopes, filing supplies, etc., that account for approximately 58 percent of the industry output.

Over the five year period 1972-1976 inclusive, real net growth has been approximately 2 percent per year with apparent growth over the same period in current dollars at 13 percent per year. The inflationary effect masks a real growth in 1975 over 1974 amounting to almost 9 percent and the almost nil real growth in 1976 over 1975.

Within the period a modest growth trend in employment has apparently peaked and a downward trend is evident in later years. From a high of 231 plants in 1972 the number has dropped to 215 in 1976.

General Industry Characteristics

The converting industry in Canada is, in the main, domestically oriented with a high degree of localized market activity. Canada's relatively small population combined with the distance between major consumption centres result in a concentration of manufacturing capacity in these regions. The industry is characterized by a large number of relatively small production units that exist as independents under owner-operator control. Of approximately 500 plants about 280 have 49 or less employees and only about 60 have more than 200 employees.

Vertical integration, while not a predominant feature of the converting industry as a whole, does exist clearly in the corrugated and paper bag segments. In the former the integrated companies account for more than 70 percent of shipments. In the latter the multiwall sack market is almost entirely in the hands of the integrated producers as is, to a lesser degree, the checkstand bag business.

For the entire converted paper sector, the total number of plants did not change significantly from 1971 to 1976 but there was industry restructuring within specific production sectors and the industry did realize gains in labour productivity. The number of employees increased annually at about one percent whereas the apparent yearly growth of value of shipments averaged about 13 percent compounding, in current dollars.

The fragmentation of ownership and production facilities notwithstanding, the Canadian converting industry compares favourably with that of other nations in the application of many areas of technology. However, the converting paper industries in some countries, based as they are on larger domestic markets, have greater incentive to develop improved technologies, and a significant number of products developed outside Canada are also manufactured here under licence. Most of the standard (i.e., non-customized) converting machinery used in Canada is imported from the U.S. or Europe.

The limited size of the domestic market and its dispersion also results in a relatively basic marketing approach by the industry. In the main, the simple distribution channel of converter to user governs in the highly localized markets that characterize the industry. Exports are limited; they were \$25 million in 1970 and rose to \$42 million in 1977. These exports are principally to the U.S., and are a small proportion of total shipments. On the other hand, U.S. exports of converted products to Canada were \$65 million and \$138 million in the same years. This relatively high level, which continues to show a strong upward trend, has been a matter of expressed concern to some parts of the industry and is becoming increasingly so for some of the larger firms.

INTERNATIONAL PERSPECTIVE

WORLD WOOD FIBRE SUPPLY

The most reliable information concerning forest inventories on a global basis is provided by the Food and Agriculture Organization of the United Nations (FAO). According to data collected by FAO, the forested area of the world represents 2,725 million hectares or 22 percent of total land area. Table 41 indicates the distribution of the world's closed forests (land with forest cover). It is not possible to estimate the volume of standing timber in the tropical countries with any degree of accuracy and consequently, comparisons are made on an area basis. There are approximately 75 million hectares of plantation forests (primarily pine and eucalyptus) in Latin America, the Pacific (excluding China and Japan) and Africa.

TABLE 41

World Forest Resources

| | (millions of hectares) | | | (millions of acres) | | |
|-----------------|------------------------|-------------------------|--------------|---------------------|-------------------------|--------------|
| | <u>Coniferous</u> | <u>Broad Leaved</u> | <u>Total</u> | <u>Coniferous</u> | <u>Broad Leaved</u> | <u>Total</u> |
| North America | 400 | 230 | 630 | 988 | 568 | 1,557 |
| Central America | 20 | 40 | 60 | 49 | 99 | 148 |
| South America | 14 | 516 | 530 | 35 | 1,275 | 1,310 |
| Africa | 2 | 118 | 120 | 5 | 292 | 297 |
| Europe | 75 | 65 | 140 | 185 | 161 | 346 |
| U.S.S.R. | 553 | 212 | 765 | 1,366 | 524 | 1,890 |
| Asia | 65 | 335 | 400 | 161 | 828 | 988 |
| Pacific Area | <u>11</u> | <u>69</u> | <u>80</u> | <u>27</u> | <u>170</u> | <u>198</u> |
| WORLD TOTAL | 1,140 | 1,585 | 2,725 | 2,816 | 3,917 | 6,735 |

Source: Food and Agriculture Organization, World Forest Resources, 1974

Although the total growing stock in the world's closed forests cannot be accurately estimated, FAO conservatively estimates a total growing stock of 300,000 million cubic metres of which 100,000 million cubic metres is coniferous. On a regional basis, this estimate is broken down in Table 42.

TABLE 42

World Forest Inventory by Region, 1970

Growing Stock (with bark)
(1,000 million cubic metres)

| Region | Total Growing Stock | Conifers | Temperate Hardwoods | Tropical Hardwoods |
|-------------------------------|---------------------------|------------|------------------------|-----------------------|
| Western Europe | 9.0 | 6.6 | 2.4 | - |
| North America | 36.1 | 26.6 | 9.5 | - |
| Japan | 1.9 | 1.0 | 0.9 | - |
| Oceania | 1.2 | 0.1 | 1.0 | 0.1 |
| U.S.S.R. | 73.2 | 61.2 | 12.0 | - |
| Eastern Europe | 3.5 | 1.4 | 2.1 | - |
| Latin America | 124.0 | 1.0 | - | 123.0 |
| Asia and Far East | 32.6 | 2.6 | - | 30.0 |
| Africa and Middle East | 22.7 | 0.2 | 0.1 | 22.4 |
| People's Republic of China | <u>11.4</u> | <u>1.4</u> | <u>-</u> | <u>-</u> |
| WORLD TOTAL | 315.6 | 112.1 | 28.0 | 175.5 |

Note: One cubic metre equals 35.3 cubic feet

Source: World Wood Fibre Supplies and Canadian Pulp and Paper Prospects to 1990, Paul H. Jones, 1975.

Six major timber producing regions will determine the future pattern and development of Canada's forest industries in the international environment. Three of these, the United States, Western Europe and the U.S.S.R., produce predominantly coniferous species. In South America, Southeast Asia and Western Africa the forests are primarily tropical hardwoods. With the exception of Western Europe and North America, the natural forest resources of these regions are being exploited with little regard for regeneration.

United States

More than 200 million hectares, about 22 percent of the land area of the United States, is classified as commercial timberland. This is approximately the same area as the commercial timberland in Canada. Although the United States timber harvest is nearly three times as great as the Canadian, it should be noted that forests grow much more rapidly in the United States, particularly in the southern softwood growing regions. From Table 43 it will be seen that forest increment in the southern United States alone exceeds the total incremental growth for all Canada, that growth of temperate hardwoods in the United States is seven times that of temperate hardwoods in Canada and that the growth rate of total wood fibre in the United States is nearly two and one-half times the rate in Canada.

TABLE 43

North American Wood Fibre Increment

(millions cubic metres/year)

| | <u>Softwoods</u> | <u>%</u> | <u>Hardwoods</u> | <u>%</u> | <u>Total</u> |
|----------------------|------------------|-----------|------------------|-----------|--------------|
| <u>Canada</u> | | | | | |
| British Columbia | 92 | 17 | -- | -- | 92 |
| Prairies | 19 | 4 | 12 | 5 | 31 |
| Ontario | 25 | 5 | 10 | 4 | 35 |
| Quebec | 41 | 8 | 6 | 2 | 47 |
| Maritimes | <u>19</u> | <u>4</u> | <u>5</u> | <u>2</u> | <u>24</u> |
| TOTAL | 196 | 37 | 33 | 13 | 229 |
| <u>United States</u> | | | | | |
| South | 166 | 31 | 101 | 38 | 267 |
| North | 37 | 7 | 119 | 45 | 156 |
| Pacific Coast | 88 | 17 | 9 | 3 | 97 |
| Rocky Mountains | <u>42</u> | <u>8</u> | <u>3</u> | <u>1</u> | <u>45</u> |
| TOTAL | <u>333</u> | <u>63</u> | <u>232</u> | <u>87</u> | <u>565</u> |
| TOTAL NORTH AMERICA | 529 | 100 | 265 | 100 | 794 |

Source: World Wood Fibre Supplies. Paul H. Jones, 1975.

Almost 75 percent of all commercial timberland is privately owned, 21 percent is under federal jurisdiction and the balance is under state jurisdiction. However, the United States Forest Services (USFS) controls 46 percent of the softwood timber reserves and consequently timber policy affecting these reserves may have a significant impact on Canada's future role in the international fibre market.

According to the USFS, the domestic hardwood forests and eastern and southern softwood forests can support additional timber harvests. However, the bulk of this increase would be in smaller diameter material, suitable primarily for pulpwood rather than sawlogs. The southern U.S. is expected to produce an increasing share of domestic timber supplies, reaching half the nation's softwood supply by the year 2,000 as relative production from the western states declines.

On balance, considering current levels of forest management and increasing demand for product, the U.S. is expected to continue to be a net importer of wood fibre in its various forms over the foreseeable future.

Western Europe

The principal forest resource countries of Western Europe are Sweden and Finland although France and West Germany both have significant stands of mixed forests. Sweden and Finland have approximately 45 million hectares of commercial forests and are the main forest product exporting countries of Western Europe. Roundwood removals in 1973 were 58 million cubic metres in Sweden and 48 million cubic metres in Finland. The Swedish Forestry Commission has reported that the raw material requirements of Sweden's forest industries have now exceeded the productive capacity of the forest resource and the level of cut in 1973 cannot be maintained in the longrun under current levels of forest management. Similarly, Finnish authorities report that a balance has now been reached between the demand for industrial roundwood and supply from domestic forests. The growing scarcity of roundwood in Sweden and Finland will result in increased competition for available supplies of small and medium-sized logs between the sawmill and pulp and paper industries and it is probable that imported roundwood from the U.S.S.R. will continue to be used to supplement the domestic fibre supply in both these countries. In 1973, imports of roundwood from the U.S.S.R. were 817 thousand cubic metres and 5,300 thousand cubic metres in Sweden and Finland respectively, or six percent of combined roundwood requirements.

While forest management will undoubtedly become even more intensive than at present, the timber deficit for Western Europe is expected to increase over the next 20 years.

The Soviet Union

The U.S.S.R. accounts for more than 25 percent of the total forested area of the world, 23 percent of the total growing stock and 55 percent of the softwood reserves. Four outstanding features characterize these forests -- magnitude, generally high quality, limited number of species and wide distribution.

During the postwar boom years the Soviet forest industries were confronted with the problem of supplying the economy with the largest possible amount of wood in the shortest period of time, regardless of long-term considerations. Consequently, readily available forests were rapidly exploited. Virgin forests are currently being harvested in the northern and remote eastern regions as part of a major shift of forest-based industries away from the forest depleted provinces of the central southern and western regions. It is difficult, however, to estimate the rate of exploitation of these resources within broad guidelines for industrial development as laid down by the government. For example, a near-term domestic requirement for hydro-electric power might hasten development of large forestry complexes.

The U.S.S.R. controls more than half the world's softwood fibre and has the potential to be a major competitor in world markets. It is anticipated, however, that such a situation will not develop for some time, if at all, because of potentially large domestic requirements and the necessarily high development costs in the remote regions.

South America

In attempting to assess future trends in international trade in forest products, it should be noted that the broad leaved resources of South America which represent approximately one-third of the world resources are generally in remote regions which lack the necessary infrastructure to facilitate their extraction over the near term.

As a general rule, the forest industries throughout South America are poorly organized at the national level. Although governments play a dominant role in any development of forest resources, the existing industries in most cases are composed of many small, often inefficient plants, operating independently under government guidance without a clearly defined long-term development plan.

Brazil's forests, estimated to cover 352 million hectares, have a growing stock of 66,000 million cubic metres and an annual increment of 325 million metres. The forests of Amazonia alone cover about 275 million hectares, and it has been estimated that the annual production potential of the region is about 80 million cubic metres. In view of this, the country has been and will continue to be the most important timber producer and exporter in South America. Traditionally, parana pine has represented the bulk of timber exports, but during the past four or five years a sharp increase in domestic demand coupled with a decrease in the merchantable resource base (plantations) has led to a reduction of export of parana pine which is expected to continue.

The fast growing plantations in the southern provinces were planted to provide a uniform resource base for making pulp, paper and construction lumber for domestic use. Although Brazil is unlikely to be a major competitor in international softwood lumber markets over the near term, there is a strong possibility that within the next 10 to 15 years Brazil will have pulp and paper capacity significantly in excess of domestic requirements and will compete in international markets, particularly in the southern hemisphere, Japan and Europe. Exports of tropical hardwoods are expected to increase substantially over the next few years as the government encourages domestic and foreign investment in this relatively untapped resource area. The government is actively engaged in developing an intensive transportation system and is committed generally to improving the infrastructure of the region.

The substantial timber resources in Colombia and Bolivia cover approximately 75 million hectares, but the bulk of these are in the interior mountainous regions distant from the main population centres. These areas lack the necessary infrastructure for economic exploitation.

In most tropical timber producing countries there is a constant demand for fuelwood which consumes a substantial percentage of annual wood removals. It should also be noted that considerable areas of forest land are being cleared annually to grow food for expanding populations.

Southeast Asia

The major timber producing countries of Southeast Asia are Malaysia, Indonesia and the Philippines. In 1971, these three countries accounted for more than 90 percent of hardwood log exports from southeast Asia and approximately 60 percent of the world's export trade in tropical hardwoods. Forested land has been estimated to be 165 million hectares of which three-quarters is in Indonesia.

Unlike South America and Western Africa, this region grows a range of commercially important dipterocarps which are similar in appearance and characteristics resulting in fewer marketing problems. For example, the lauans of the Philippines and the merantis of Malaysia are often used interchangeably.

The governments of these countries are already concerned about dwindling forest resources and have taken steps to restrict log exports and encourage further domestic manufacturing. Government and trade representatives from these three countries have formed the Southeast Asian Lumber Producers' Association to regulate the cutting rate of their timber resources and thereby attempt to minimize the adverse effects of fluctuating world timber prices. It has even been suggested that this area might become a net importer of timber before the end of this century as domestic demand from rapidly expanding population increases. The major customer, Japan, is already looking to the future by investing in the relatively untouched forest regions of Papua New-Guinea.

Western Africa

The major timber producing countries of Western Africa are Ghana, Ivory Coast, Nigeria, Cameroons, Gabon, Liberia and the People's Republic of the Congo. These eight countries account for 97 percent of African hardwood log exports and two-thirds of African sawnwood exports. In these countries, the exploitation of the forest resources has generally been controlled by foreign interests, mainly western European. Concern about the foreign influence was primarily responsible for the Bangui Conference which resulted in the formation of a regional organization designed to ensure the efficient utilization of their forest resources.

It has been estimated that the commercial forests of the eight named countries cover approximately 50 million hectares. These countries have been traditional suppliers of tropical hardwoods to western Europe and it would appear that their marketing thrust over the foreseeable future will continue in this direction.

WORLD FOREST INDUSTRIES

Forest products constitute a significant component of international trade in manufactured goods. The Canadian forest industry, while a major exporter in world terms, faces strong competition in many export markets, particularly the United States. Because of intense competition in export markets, from both domestic producers and increasingly from competitive exporters in third countries, changing world developments require continuing examination. These developments have a significant bearing on the viability and growth prospects of the Canadian forest industries.

According to the FAO, the roundwood equivalent of industrial forest products which are traded internationally represent about 32 percent of world consumption, a doubling of the proportion traded in the 1950s. The volume of trade of forest products has grown about 5 percent per year while the value of trade has increased five-fold from 1961 to 1976.

While more than 80 percent of world trade originates and terminates in developed countries, the developing countries are assuming an increasingly significant position. In contrast to the 1950's, the developed countries are now net importers of industrial forest products (including logs) to the extent of 2 percent of their total consumption. However, they remain net exporters to the developing regions of most processed forest products, particularly paper. Competition from developing countries is expected to intensify in the future as many countries in Southeast Asia and Latin America continue to develop more fully their sizable forest resources, often with considerable assistance from international aid organizations.

Certain regions of the world have become heavily dependent on imports of forest products. For example, 1976 imports into Western Europe and Japan increased to 25 percent of world trade in comparison with 5 percent in the mid 1950s. The significant trends in the developing world are the rapid growth in exports of roundwood, sawnwood and plywood from Asia and increases in log exports from Africa.

Canada's share of the value of world exports of all forest products declined from 25 percent in 1961 to 23 percent in 1968 and 20 percent in 1976. The overall reduction is due in part to increased export capabilities from the developing countries and also from established producers in the United States and Scandinavia.

The United States

Both industrial and market trends for forest products in the U.S. have a very important effect on the Canadian forest industries. The U.S. industry produces the full range of forest products to supply their market as well as offshore markets, whereas Canadian manufacture of forest products is largely concentrated in the lumber, pulp and newsprint product catalogues, with a relatively higher level of exports of these products. Depending on the product, the U.S. accounts for between 20 and 40 percent of world production, while U.S. consumption represents an even greater proportion of world production. Imports exceed exports in lumber, plywood, other wood based panels, pulp and especially newsprint. Only in the category of other paper and board do U.S. exports consistently exceed imports.

Table 45 presents United States production, export, import and apparent consumption statistics for primary forest products from 1974 to 1976.

TABLE 45

United States Forest Industry Statistics

| | 1974 | | 1975 | | 1976 | |
|--------------------------------|---------------|-----------------------|---------------|-----------------------|---------------|-----------------------|
| | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> |
| <u>Softwood Lumber</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 65,381 | 20 | 63,111 | 21 | 72,732 | 22 |
| Exports | 3,673 | 7 | 3,248 | 8 | 3,715 | 7 |
| Imports | 15,886 | 31 | 13,314 | 31 | 17,712 | 33 |
| Apparent Consumption | 77,594 | 24 | 73,177 | 24 | 86,779 | 27 |
| <u>Plywood</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 15,172 | 42 | 14,579 | 43 | 16,727 | 43 |
| Exports | 399 | 8 | 514 | 10 | 478 | 8 |
| Imports | 1,337 | 25 | 1,674 | 31 | 1,936 | 31 |
| Apparent Consumption | 16,110 | 44 | 15,739 | 46 | 18,185 | 47 |
| <u>Other Wood-Based Panels</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 27,247 | 31 | 23,324 | 29 | 27,867 | 30 |
| Exports | 977 | 8 | 1,025 | 8 | 1,093 | 8 |
| Imports | 2,300 | 17 | 2,184 | 18 | 2,713 | 19 |
| Apparent Consumption | 28,570 | 33 | 24,483 | 30 | 29,487 | 32 |
| <u>Wood Pulp</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 41,448 | 35 | 36,708 | 36 | 41,130 | 37 |
| Exports | 2,544 | 13 | 2,391 | 17 | 2,283 | 14 |
| Imports | 3,691 | 20 | 2,770 | 19 | 3,359 | 21 |
| Apparent Consumption | 42,595 | 36 | 37,087 | 36 | 42,206 | 38 |
| <u>Newsprint</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 3,080 | 13 | 3,153 | 15 | 3,104 | 14 |
| Exports | 175 | 2 | 159 | 2 | 115 | 1 |
| Imports | 6,712 | 56 | 5,305 | 54 | 5,959 | 56 |
| Apparent Consumption | 9,617 | 41 | 8,299 | 38 | 8,948 | 39 |
| <u>Other Paper and Board</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 36,410 | 39 | 34,394 | 40 | 35,662 | 39 |
| Exports | 2,718 | 21 | 2,092 | 22 | 2,418 | 20 |
| Imports | 240 | 2 | 138 | 2 | 116 | 1 |
| Apparent Consumption | 33,932 | 36 | 32,440 | 38 | 33,360 | 37 |

Note: Apparent consumption = production less exports plus imports

Source: Food and Agriculture Organization.

In 1976, the U.S. industry produced some 41 million metric tons of wood pulp and 39 million tons of paper and board. Imports were three million tons of pulp and six million tons of newsprint.

In newsprint particularly, the U.S. has been increasing its self-sufficiency. The U.S. industry now supplies one-third of U.S. consumption needs, with a 1976 production of three million tons, compared with one-fifth of consumption 20 years ago. Because of more favourable costs, due in part to higher operating ratios (95 percent over the 1971-5 period compared with 85 percent for Canadian mills), growth of newsprint capacity in the United States will likely exceed that of Canada.

Although developments in the U.S. newsprint industry are very important to Canada, U.S. producers of other paper and board are far more significant in terms of output. In 1976, U.S. mills produced 12 million metric tons of printing papers, 11 million tons of linerboard, four million tons of tissue, and four million tons of unbleached kraft packaging grades. These production volumes, possible because of market size, have resulted in specialization, economies of scale and related cost advantages. U.S. imports of these products are therefore relatively low and exports relatively high. Canadian producers are vulnerable in the domestic market particularly at times of slack demand in the U.S. market.

The outlook for expansion in the U.S. pulp and paper industry is one of continued increases in the intermediate term. The Stanford Research Institute report on "Investment Outlook and Related Federal Policies for the Paper Industries, 1976 to 1983" concludes as follows:

"Total paper and paperboard capacity required to meet estimated production will increase at a rate of about 2.8 million tons (short tons) per year over the 1976-85 period. The average annual rates of increase in required capacity will be 4.4% for 1976-80 and 3.8% for 1980-85. In contrast, the annual rate of increase over the 1970-74 period was only 2.4%.

"Total wood pulp consumption required for domestic paper and paperboard production will increase at an average annual rate of increase of 3.4% over the 1976-85 period. Imports will increase slowly: they will account for about 8.6% of consumption in 1976 and 8.9% by 1985. Exports also will increase very slowly and remain at about 9% of domestic production. Domestic production requirements of total wood pulp will increase at an annual rate of 2.9% between 1976 and 1980 and 3.3% between 1980 and 1985. Domestic production will continue to account for about 95% of domestic consumption over the whole period."

As in Canada, rapidly escalating capital costs have resulted in an economic advantage, and a consequent trend, for additional capacity through modernization rather than construction of new mills.

The U.S. lumber industry is highly fragmented with sawmills similar to those in Canada. The larger integrated producers have advantages in resource utilization and timber resources which provide tax advantages. Smaller producers without their own timberlands are concerned about the long-term availability of raw material.

Consumption of lumber, which is very much dependent on conditions in the residential construction market, has experienced relatively slow long-term growth rates. The major consuming areas are the eastern, southern and north central states. The major producing areas are the western states with some 60 percent of lumber output and the southern states with about 30 percent.

The Canadian industry has significantly increased its share of the U.S. lumber market. Eastern Canadian producers are selling into the northern states. While most of the rail shipments from B.C. to all parts of the U.S. come from the interior of the province, coastal producers have benefited in their shipments to Atlantic cargo markets by restrictions on waterborne shipping of U.S. goods in foreign vessels.

Production capacity of the U.S. softwood plywood industry has grown considerably over the last decade and exceeds 21 billion square feet on a three-shift, five-day basis. Production is concentrated in the southern and western regions, with Oregon producing about half of total volumes and the southern states about one-third but increasing rapidly. The industry is becoming more capital intensive, and the number of mills is currently less than 200. Ownership is concentrated, with the top five companies accounting for 40 percent of output.

The U.S. industry ships over 90 percent of production to the domestic market which comprises primarily the new residential market and the housing aftermath including homeowner repair and remodelling. Intensified competition from U.S. producers in the Canadian market is dependent to a large degree on the state of the U.S. housing sector. A favourable housing situation will fully utilize U.S. production capacity whereas any slack will tend to increase competition in the Canadian market from surplus U.S. production.

European Economic Community

The nine countries of the Community collectively constitute the largest import market for forest products in the world. Although production of forest products is significant in world terms, imports greatly exceed exports in all categories. This is evident from Table 46 which presents the major forest industry statistics for the EEC from 1974 to 1976.

TABLE 46

European Economic Community Forest Industry Statistics

| | 1974 | | 1975 | | 1976 | |
|--------------------------------|---------------|-----------------------|---------------|-----------------------|---------------|-----------------------|
| | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> |
| <u>Softwood Lumber</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 16,116 | 5 | 14,058 | 5 | 15,882 | 5 |
| Exports | 1,070 | 2 | 759 | 2 | 1,105 | 2 |
| Imports | 21,320 | 41 | 15,600 | 37 | 22,063 | 41 |
| Apparent Consumption | 36,366 | 11 | 28,899 | 10 | 36,840 | 11 |
| <u>Plywood</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 1,629 | 5 | 1,486 | 4 | 1,596 | 4 |
| Exports | 450 | 9 | 409 | 8 | 428 | 7 |
| Imports | 1,862 | 35 | 1,789 | 33 | 2,446 | 39 |
| Apparent Consumption | 3,041 | 8 | 2,867 | 8 | 3,614 | 9 |
| <u>Other Wood-Based Panels</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 15,177 | 17 | 14,873 | 18 | 16,251 | 18 |
| Exports | 3,169 | 25 | 2,843 | 23 | 3,268 | 23 |
| Imports | 6,176 | 47 | 5,542 | 46 | 6,982 | 50 |
| Apparent Consumption | 18,184 | 21 | 17,572 | 22 | 19,965 | 21 |
| <u>Wood Pulp</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 5,840 | 5 | 4,927 | 5 | 5,451 | 5 |
| Exports | 530 | 3 | 317 | 2 | 504 | 3 |
| Imports | 8,973 | 48 | 6,691 | 46 | 7,893 | 48 |
| Apparent Consumption | 14,283 | 12 | 11,301 | 11 | 12,840 | 12 |
| <u>Newsprint</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 1,693 | 7 | 1,497 | 7 | 1,559 | 7 |
| Exports | 160 | 1 | 125 | 1 | 157 | 2 |
| Imports | 2,933 | 24 | 2,310 | 24 | 2,729 | 25 |
| Apparent Consumption | 4,466 | 19 | 3,682 | 17 | 4,131 | 18 |
| <u>Other Paper and Board</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 13,754 | 15 | 11,496 | 14 | 13,330 | 15 |
| Exports | 2,371 | 19 | 1,549 | 17 | 2,222 | 18 |
| Imports | 6,726 | 55 | 4,302 | 46 | 5,808 | 51 |
| Apparent Consumption | 18,109 | 19 | 14,249 | 17 | 16,916 | 19 |

Note: Apparent consumption = production less exports plus imports

Note: Export and import figures include trade between countries in the EEC.

Source: Food and Agriculture Organization.

It should be noted that viewing of the Community as a monolithic entity masks important distinctions among the domestic industries of the nine countries which comprise it. For example, France and West Germany meet most of their own requirements for softwood lumber, whereas Britain is highly dependent on imports. West Germany, on the other hand, although it is the largest industrial state in the EEC, has not yet produced softwood kraft pulp because of concerns about air pollution.

Forest industries in the EEC are efficient to varying degrees. Modernization and restructuring programs have been underway for some time in the pulp and paper sector, partially to address problems of scale. The one constraint that overrides all others in its effect on future growth and development is the limitation of forest resources. The annual cut is around 85 million cubic metres providing about one-half of the timber required for self-sufficiency. Except for a small but increasing importation of logs from developing countries, the balance is imported in product form primarily from the Scandinavian countries.

The dominance of the Scandinavian countries as suppliers is due to traditional relationships, location, intercorporate links and better tariff access than is granted to Canada or other GATT signatories. In the longer terms, the EEC is concerned about the ability of the Nordic countries to meet even the relatively slow growth in demand projected for Community countries, as the forests of Western Europe reach their limit of fibre supply around 1985. The EEC is also concerned about the desire of the Scandinavian countries to process to the greatest degree possible products they export to the community.

Although the EEC markets offer the Canadian industry some favourable sales prospects, much of the potential is for primary products such as pulp. Increased exports of the higher valued paper products, for example, will be difficult in view of the preferred position of the Scandinavian suppliers.

Scandinavia

Although the total volume of forest products is approximately the same for the Scandinavian countries and Canada, the mix and value of production are quite different. The Scandinavian countries produce relatively less plywood and more other wood panels than does Canada. In the paper grades, Scandinavia produces about one-third Canada's volume of newsprint but has about twice the production of other paper and board. The Scandinavian countries have a high percentage of exports, mostly to Western Europe. The shares of production exported in 1976 were 57 percent for softwood lumber, 58 percent for plywood, 42 percent for other wood based panels, 32 percent for pulp, 80 percent for newsprint, and 76 percent for other paper and board.

Table 47 provides the major forest industry statistics from 1974 to 1976 for the three Scandinavian countries in total.

TABLE 47

Scandinavian Forest Industry Statistics

| | 1974 | | 1975 | | 1976 | |
|--------------------------------|---------------|-----------------------|---------------|-----------------------|---------------|-----------------------|
| | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> |
| <u>Softwood Lumber</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 23,241 | 7 | 17,622 | 6 | 19,225 | 6 |
| Exports | 12,113 | 23 | 8,351 | 19 | 10,875 | 19 |
| Imports | 259 | 1 | 280 | 1 | 408 | 1 |
| Apparent Consumption | 11,387 | 4 | 9,551 | 3 | 8,758 | 3 |
| <u>Plywood</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 708 | 2 | 557 | 2 | 627 | 2 |
| Exports | 414 | 10 | 295 | 6 | 363 | 6 |
| Imports | 112 | 2 | 109 | 2 | 135 | 2 |
| Apparent Consumption | 406 | 1 | 371 | 1 | 399 | 1 |
| <u>Other Wood-Based Panels</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 4,743 | 6 | 3,658 | 5 | 4,061 | 4 |
| Exports | 1,964 | 16 | 1,548 | 13 | 1,717 | 12 |
| Imports | 273 | 2 | 262 | 2 | 312 | 2 |
| Apparent Consumption | 3,052 | 4 | 2,372 | 3 | 2,656 | 3 |
| <u>Wood Pulp</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 18,540 | 16 | 15,329 | 15 | 15,471 | 14 |
| Exports | 6,921 | 36 | 4,780 | 32 | 5,021 | 30 |
| Imports | 286 | 2 | 302 | 2 | 258 | 2 |
| Apparent Consumption | 11,905 | 10 | 10,351 | 11 | 10,708 | 10 |
| <u>Newsprint</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 2,951 | 13 | 2,640 | 13 | 2,621 | 12 |
| Exports | 2,540 | 22 | 2,077 | 23 | 2,109 | 21 |
| Imports | - | - | - | - | - | - |
| Apparent Consumption | 411 | 2 | 563 | 3 | 512 | 2 |
| <u>Other Paper and Board</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 6,733 | 7 | 4,894 | 6 | 5,844 | 6 |
| Exports | 4,916 | 39 | 3,120 | 33 | 4,444 | 37 |
| Imports | 274 | 2 | 230 | 2 | 274 | 2 |
| Apparent Consumption | 2,091 | 2 | 2,004 | 2 | 1,674 | 2 |

Note: Apparent consumption = production less exports plus imports.

Source: Food and Agriculture Organization.

There are differences in size, industry structure and resource availability between the three Scandinavian countries. The forest industry sector is largest in Sweden and smallest in Norway. Of the three countries, Norway has the most serious timber availability problems and the smallest scale facilities as well as the least integrated and efficient pulp and paper industry. This situation could change if the government applies revenues from future oil and gas developments to support industry modernization and forest improvement.

Lumber, and to a lesser extent plywood, are marketed almost exclusively in Europe with Britain the largest, single destination. Although Nordic producers are very competitive in Western Europe, they will face increasing problems over the medium term in obtaining adequate logs for sawing and peeling.

Because of the characteristics of regional fibre supply and lower growth anticipated in European demand for paper and board, the Scandinavians may avoid a serious fibre shortage for these products for up to a decade.

Generally throughout the industry in this region, silviculture and modernization activity are considerably more advanced than in Canada. Although the Scandinavians (particularly Sweden and Finland) will increasingly encounter fibre supply difficulties and high wood costs, their industries generally have some comparative advantages including lower equipment costs, energy efficient mills, relatively lower corporate taxes, and favourable transportation costs from mill to market.

Japan

Japan is a significant producer of all forest products. Their production of the protected grades, i.e., wood-based panels and paper other than newsprint and board, greatly exceeds that of Canada. In 1976 Japan produced slightly more lumber but significantly less pulp and newsprint.

Table 48 presents Japanese forest industry statistics from 1974 to 1976.

TABLE 48

Japan Forest Industry Statistics

| | 1974 | | 1975 | | 1976 | |
|--------------------------------|---------------|-----------------------|---------------|-----------------------|---------------|-----------------------|
| | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> |
| <u>Softwood Lumber</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 29,515 | 9 | 27,362 | 9 | 28,649 | 9 |
| Exports | 1 | - | 2 | - | 5 | - |
| Imports | 3,021 | 6 | 2,404 | 6 | 3,013 | 6 |
| Apparent Consumption | 32,535 | 10 | 29,764 | 10 | 31,657 | 10 |
| <u>Plywood</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 7,443 | 21 | 6,174 | 18 | 7,120 | 18 |
| Exports | 123 | 3 | 116 | 2 | 133 | 2 |
| Imports | 420 | 8 | 148 | 3 | 84 | 1 |
| Apparent Consumption | 7,740 | 21 | 6,206 | 18 | 7,071 | 18 |
| <u>Other Wood-Based Panels</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 8,917 | 10 | 7,654 | 9 | 8,764 | 10 |
| Exports | 130 | 1 | 122 | 1 | 140 | 1 |
| Imports | 465 | 4 | 165 | 1 | 103 | 1 |
| Apparent Consumption | 9,252 | 11 | 7,697 | 10 | 8,727 | 9 |
| <u>Wood Pulp</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 10,017 | 9 | 8,613 | 8 | 9,502 | 9 |
| Exports | 237 | 1 | 151 | 1 | 138 | 1 |
| Imports | 1,501 | 8 | 1,030 | 7 | 1,077 | 7 |
| Apparent Consumption | 11,281 | 10 | 9,492 | 9 | 10,441 | 9 |
| <u>Newsprint</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 2,233 | 10 | 2,160 | 10 | 2,341 | 11 |
| Exports | 112 | 1 | 107 | 1 | 96 | 1 |
| Imports | 92 | 1 | 30 | - | 40 | - |
| Apparent Consumption | 2,213 | 9 | 2,083 | 10 | 2,285 | 10 |
| <u>Other Paper and Board</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 10,475 | 11 | 8,668 | 10 | 10,003 | 11 |
| Exports | 353 | 3 | 405 | 4 | 412 | 3 |
| Imports | 234 | 2 | 110 | 1 | 123 | 1 |
| Apparent Consumption | 10,356 | 11 | 8,373 | 10 | 9,714 | 11 |

Note: Apparent consumption = production less exports plus imports.

Source: Food and Agriculture Organization.

As indicated in Table 48, Japan produces almost entirely for the domestic market. While some lumber and pulp are imported into Japan, the imports of forest products are surprisingly small when compared to total consumption and available forest resources.

Imports are predominantly in unprocessed form, and in fact, Japan is involved in over two-thirds of the world trade in logs. Most of these come from Southeast Asia, but the United States and the U.S.S.R. are significant sources. Table 49 indicates trends of log supply to Japan from Southeast Asia:

TABLE 49
Japanese Log Supply from Southeast Asia

('000 cubic metres)

| | <u>Philippines</u> | <u>Indonesia</u> | <u>Malaysia</u> | <u>Others</u> | <u>Total</u> |
|------|--------------------|------------------|-----------------|---------------|--------------|
| 1969 | 7,915 | 2,698 | 6,153 | 397 | 17,163 |
| 1971 | 5,701 | 8,181 | 5,750 | 627 | 20,259 |
| 1973 | 5,896 | 11,232 | 8,654 | 1,008 | 26,789 |
| 1975 | 2,853 | 7,299 | 6,660 | 522 | 17,333 |
| 1977 | 1,503 | 9,273 | 9,628 | 546 | 20,947 |

Source: Japan Lumber Journal

Certain sectors of the Japanese forest industry are modern with large scale mills, although pollution control and raw material availability are constraints to future growth and development. The sawmill industry, however, is dominated by small producers.

Union of Soviet Socialist Republics

The U.S.S.R. accounts for over 30 percent of the world's softwood lumber production, but in terms of available resources, relatively smaller shares of the other forest products. Compared with production levels, forest product exports are low, except for the lumber industry, where eight million cubic metres of product is consigned to market economies, particularly Britain and continental Europe.

Table 50 presents major forest industry statistics from 1974 to 1976.

TABLE 50

U.S.S.R. Forest Industry Statistics

| | 1974 | | 1975 | | 1976 | |
|---------------------------------------|---------------|-----------------------|---------------|-----------------------|---------------|-----------------------|
| | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> | <u>Volume</u> | <u>% of World</u> |
| <u>Softwood Lumber</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 101,500 | 32 | 102,000 | 34 | 101,000 | 31 |
| Exports | 7,790 | 15 | 7,826 | 18 | 8,550 | 15 |
| Imports | 62 | - | 62 | - | 84 | - |
| Apparent Consumption | 93,772 | 29 | 94,236 | 31 | 92,534 | 28 |
| <u>Plywood</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 2,142 | 6 | 2,196 | 6 | 2,174 | 6 |
| Exports | 300 | 6 | 303 | 6 | 319 | 5 |
| Imports | 47 | 1 | 46 | 1 | 56 | 1 |
| Apparent Consumption | 1,889 | 5 | 1,939 | 6 | 1,911 | 5 |
| <u>Other Wood-Based Panels</u> | | | | | | |
| ('000 cubic metres) | | | | | | |
| Production | 8,119 | 9 | 8,578 | 11 | 8,771 | 10 |
| Exports | 769 | 6 | 822 | 7 | 865 | 6 |
| Imports | 75 | 1 | 78 | 1 | 114 | 1 |
| Apparent Consumption | 7,425 | 8 | 7,834 | 10 | 8,020 | 9 |
| <u>Wood Pulp</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 8,182 | 7 | 8,182 | 8 | 8,182 | 7 |
| Exports | 491 | 3 | 515 | 3 | 632 | 4 |
| Imports | 198 | 1 | 244 | 2 | 197 | 1 |
| Apparent Consumption | 7,889 | 7 | 7,911 | 8 | 7,747 | 7 |
| <u>Newsprint</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 1,334 | 6 | 1,361 | 7 | 1,390 | 6 |
| Exports | 289 | 3 | 68 | 1 | 290 | 3 |
| Imports | 42 | - | 46 | 1 | 31 | - |
| Apparent Consumption | 1,087 | 5 | 1,339 | 6 | 1,131 | 5 |
| <u>Other Paper and Board</u> | | | | | | |
| ('000 metric tons) | | | | | | |
| Production | 5,806 | 6 | 6,111 | 7 | 6,376 | 7 |
| Exports | 577 | 5 | 591 | 6 | 621 | 5 |
| Imports | 265 | 2 | 265 | 3 | 395 | 4 |
| Apparent Consumption | 5,494 | 6 | 5,785 | 7 | 6,150 | 7 |

Note: Apparent consumption = production less exports plus imports

Source: Food and Agriculture Organization.

There is limited information available on the strengths and competitive potential of the U.S.S.R. forest products industry. In terms of efficiency, its pulp and paper industry would appear to lag behind forest industry development in other major producing regions. FAO surveys indicate that pulp and paper capacity should increase, about 4 percent per year through 1980, but as mentioned, the industry's potential to export is limited in view of large domestic requirements vis-à-vis limited production capacity. The situation in softwood lumber, however, is different and the very large production base (one-third of world production) should enable the Soviets to increase shipments to Western Europe.

Developing Countries

The developing countries with half of the stocked forests of the world produce relatively small volumes of forest products. Although roundwood sawn timber and panel products, mostly from tropical woods, have become very competitive in world markets, the establishment of large scale pulp and paper mills in developing countries is more likely to improve self sufficiency.

Forest industry growth in developing countries is encouraged by the following factors:

- (i) larger forest product deficits in the developed regions due to increasingly limited and costly wood supply and pressures for conservation, environmental control and pollution abatement;
- (ii) improved technologies in harvesting and pulping which more readily permit the use of mixed tropical hardwoods;
- (iii) establishment of fast growing hardwood and pine plantations.

Although specific projects have been announced, most will not come into production before the mid 1980s. Several Canadian firms have explored the possibility of development in these areas, but there have been few indications of plans for Canadian owned facilities on any scale.

While the forest industries located in these areas may have a comparative advantage in wood cost, particularly out of plantation areas, costs for operations and new infrastructure are likely to be much higher. The desire of developing countries for self-sufficiency, resource utilization, industrial progress, and monetary exchange may override these economic disadvantages and force expansion, especially to supply domestic markets. Consequently, Canada and other exporting nations should not place too much reliance on these markets for their products.

In fact, over the longer term, the creation of an export capability from certain developing countries is entirely conceivable. These countries include a number in Africa and South America, particularly Brazil where new operations are now under construction.

Brazilian chemical pulp capacity is anticipated to exceed three million tons in 1980 with a potential export capability of close to one million tons. This represents a reduction in earlier export goals set by the Brazilian government and may still prove optimistic. The rate of planned capacity expansion was reduced as a result of concerns about a prolonged pulp surplus and because of substantial cost overruns experienced on existing construction projects.

GENERAL ECONOMIC OUTLOOK

The future of the Canadian forest products industry depends to a considerable degree on growth both domestically and throughout the world where Canadian products are sold in large volumes. Demand for forest products traditionally relates to both economic growth in the longer term and economic cycles in the shorter term. Economies in the key markets, United States, Europe and Japan, are particularly important.

Long-term economic forecasts are fundamental to the various aspects of planning and related strategic considerations. However, instabilities in the domestic and international economies in recent years have caused uncertainty and have reduced the reliability of extrapolating historical trends in projecting to the year 1990. Moreover, most projections are trend projections which do not allow for cyclical distortions. The mathematical model, which is the principal tool of forecasting economic aggregates for countries, takes into account the complex interaction of economic factors and is useful in testing the sensitivities of the forecasts to changed assumptions.

Earlier forecasts by the Organization for Economic Co-operation and Development (OECD) for growth rates from 5 to 6 percent to 1980 for member countries, including Canada and the United States, are considerably above the economic growth that has actually taken place. Since these projections were made, member countries have indicated that they would prefer moderate expansion in their economies to reduce inflation while minimizing unemployment rates, a difficult task for many countries.

Table 51 provides the actual and projected growth rates of real GNE and population in Canada from 1970 to 1990.

TABLE 51

Growth of Real GNE and Population in Canada to 1990

| | GNE (1970 \$ billion) | Av. Ann. Population % Change | Population (million) | Av. Ann. GNE/Head % Change | GNE/Head 1970 \$ | Av. Ann. % Change |
|------|--------------------------|---------------------------------|-------------------------|-------------------------------|---------------------|----------------------|
| 1970 | 85.7 | | 21.3 | | 4023 | |
| | | 4.7 | | 1.3 | | 3.3 |
| 1975 | 107.6 | | 22.7 | | 4740 | |
| | | 5.3 | | 1.2 | | 4.0 |
| 1980 | 139.1 | | 24.1 | | 5772 | |
| | | 4.3 | | 1.2 | | 3.1 |
| 1985 | 171.9 | | 25.6 | | 6715 | |
| | | 3.3 | | 1.1 | | 2.2 |
| 1990 | 202.3 | | 27.1 | | 7465 | |

Source: Department of Finance

The real growth in output for the period 1980 to 1985 is projected at 4.3 percent and that for 1985 to 1990, 3.3 percent. Both these rates are distinctly lower than historical rates and those forecast earlier. Reasons for these reduced rates include a slight decline in the population growth rate combined with a more rapid decline in the growth of the labour force (a reversal of the trend to 1975) as well as expected reductions in the growth of exports and investment.

Forecasts for the United States economy taken from the Wharton model are broadly similar to those from Canada, as shown in Table 52.

TABLE 52

Growth of Real GNE and Population in the United States to 1985

| | <u>GNE</u> <u>(1970 \$ billion)</u> | <u>Av. Ann. Population</u> <u>% Change</u> | <u>Population</u> <u>(million)</u> | <u>Av. Ann. GNE/Head</u> <u>% Change</u> | <u>GNE/Head</u> <u>1958 \$</u> | <u>Av. Ann.</u> <u>% Change</u> |
|------|--|---|---------------------------------------|---|-----------------------------------|------------------------------------|
| 1970 | 722 | | 205 | | 3522 | |
| | | 1.9 | | 0.9 | | 1.0 |
| 1975 | 791 | | 214 | | 3696 | |
| | | 5.5 | | 0.8 | | 4.7 |
| 1980 | 1035 | | 223 | | 4641 | |
| | | 3.0 | | 1.0 | | 2.0 |
| 1985 | 1200 | | 234 | | 5128 | |

Source: Wharton and U.S. Bureau of Census

The pattern of reduced rates into the 1980's is of prime significance since the United States will continue to dominate as a market for Canadian forest products.

Table 53 presents an economic outlook for other world regions.

TABLE 53

Growth of Real GDP in World Regions Other Than North America

| | Western Europe | | | Japan | | | Latin America | | | Other Eastern Hemisphere | | | Centrally Planned Economies | | |
|------|------------------------|----------------------|--|-------------------------|----------------------|--|-------------------------|----------------------|-----|--------------------------|----------------------|--|-----------------------------|----------------------|--|
| | GDP 1975 \$billion) | Av. Ann. % Change | | GDP (1975 \$billion) | Av. Ann. % Change | | GDP (1975 \$billion) | Av. Ann. % Change | | GDP (1975 \$billion) | Av. Ann. % Change | | GDP (1975 \$billion) | Av. Ann. % Change | |
| 1960 | 903.1 | 5.1 | | 134.9 | 10.1 | | 145.5 | | 5.4 | 276.2 | 5.1 | | 534.6 | 5.4 | |
| 1965 | 1,156.3 | 4.8 | | 218.3 | 11.6 | | 189.1 | | 5.7 | 354.9 | 6.0 | | 694.3 | 6.1 | |
| 1970 | 1,461.1 | 3.8 | | 377.0 | 5.8 | | 249.2 | | 6.1 | 474.7 | 5.5 | | 931.6 | 6.3 | |
| 1975 | 1,758.0 | 3.3 | | 498.8 | 6.3 | | 335.0 | | 5.8 | 621.0 | 6.1 | | 1,226.0 | 5.5 | |
| 1980 | 2,062.4 | 3.2 | | 678.4 | 5.3 | | 444.0 | | 5.7 | 834.6 | 6.0 | | 1,654.6 | 5.0 | |
| 1985 | 2,410.5 | 2.9 | | 878.3 | 4.3 | | 585.8 | | 5.2 | 1,117.7 | 5.7 | | 2,111.8 | 4.5 | |
| 1990 | 2,779.7 | | | 1,084.1 | | | 754.8 | | | 1,476.3 | | | 2,631.6 | | |

Source: Food and Agricultural Organization, 1978.

Although the assumptions in these projections are not necessarily compatible with those used for projecting the above growth rates for the Canadian and United States economies, this outlook provides a general indication of economic direction in major offshore markets for Canadian products. The economies in the developing regions and the centrally planned economies will grow relatively faster than in the developed countries. Japan's economic growth will stabilize at more normal levels compared with the 1960s but will grow at faster rates than those for Western Europe and North America.

Projections into the very long term require examination of the fundamental economic variables such as population growth, technological change, natural resource limitations, new energy sources, pollution and waste disposal. These long-term projections of economic growth have been made by various organizations such as the Club of Rome. With limitations in world resources and assuming exponential growth in the demands on the economic system, these projections point to some very serious difficulties into the next century.

While this subject remains highly controversial, it is interesting to speculate on the role of the forest industry with its renewable resource characteristic and its longer-term potential for foodstuffs and energy supplies along with the more traditional uses of paper and building materials.

HORIZONTAL FACTORS AFFECTING CANADA'S COMPETITIVE POSITION

SUPPLY OF TIMBER

Forests dominate the landscape in Canada accounting for about one-third of the country's total land area. It is this valuable resource that has provided the base for the forest industry's historical growth and is critical to the industry's future. This section outlines Canada's forest resources in terms of ownership patterns, production trends, annual allowable cuts and potential for future industrial development.

Forest Land

The 1973 National Forest Inventory indicates that Canada has a total forest land base of 768 million acres. Excluding forest land in the Yukon and Northwest Territories, land classified as "not suitable for regular harvest" because of low productivity, and land reserved by legislation for primary uses other than timber production, there remain about 546 million acres of forest land in Canada that has been classified as "suitable for regular harvest" (i.e., forest land that is estimated to have the capability of producing crops at regular intervals). In terms of volume, current inventory estimates are that this forest land supports over 500 billion cubic feet of mature merchantable timber, about 80 percent of which consists of softwood species. Distribution of this forest land among the different ownership classifications is shown in Table 54.

TABLE 54

Tenure of Non-Reserved Forest Land* in Canada, 1973

(millions of acres)

| | |
|------------------|-----|
| Provincial Crown | 487 |
| Federal Crown | 3 |
| Privately-owned | 56 |
| CANADA** | 546 |

Source: National Forest Inventory, 1973

* Forest land that has been classified as suitable for regular harvest.

** Does not include the Yukon and Northwest Territories.

Ownership of forest land is heavily weighted towards the provinces which together hold almost 90 percent of the non-reserved productive forest land in Canada excluding the Yukon and Northwest Territories. Private ownership is only important in some parts of the Atlantic provinces, the southern agriculture regions of Ontario and Quebec, and in some of the prime forest areas on the B.C. Coast. Federal Crown land is located for the most part in the Far North and accounts for less than 1 percent in the provinces.

The provinces have generally retained the title to forest land while setting out the terms and conditions for its use. The various tenure arrangements that are found across Canada have been a prime vehicle for implementing the forest management and industrial development policies of the different provinces over the years and have certainly been a major factor in shaping the industrial structure that has eventually evolved.

Most of the larger companies in Canada have been granted long term cutting rights to large areas of Crown land conditional on establishing processing facilities, usually pulp mills, and on performing other forest management functions as required. These licences were granted to ensure that sufficient timber was available to fulfill the long-term requirements of the mill. In the wood products sector, companies were granted quotas or harvesting rights on a shorter-term basis. Consequently, a significant proportion of accessible Crown land in Canada is committed to a number of pulp and paper companies which often precludes its use by other users. However, major changes in forest management and timber allocation policies are under way in several provinces.

The general trend appears to be away from area agreements and towards volume agreements whereby the province guarantees to supply the fibre requirements of all wood-using industries in the area. This will involve redirection of existing log and residue flows in some situations. While the stated objectives of these major policy changes are to improve the level of forest management on Crown land, to increase standards of utilization and to achieve a greater control over the pattern of industrial development, it is recognized that the uncertainty created by a sudden change in policy direction has the potential to adversely affect business confidence and investment in the forest products sector.

Production Trends

The annual cut from Canada's forests reached a peak of 5.1 billion cubic feet in 1973, which is more than double the volume harvested 20 years earlier. Total forest production for Canada as a whole declined in 1974 and 1975 in line with the downturn in forest products markets, although provinces outside of British Columbia experienced significant increases in pulpwood production in 1974 due to strong market conditions for pulp and paper which continued throughout most of the year. Total forest production subsequently recovered in 1976 with the upswing in lumber and plywood production and in 1977 and 1978 should be above the previous 1973 peak levels. The long-term trend in timber production for selected years is given in Table 55.

TABLE 55

Estimates of Total Forest Production by Species, 1953-76

(billion cubic feet)

| | <u>Softwoods</u> | <u>Hardwoods</u> | <u>All Species</u> |
|------|------------------|------------------|--------------------|
| 1953 | n/a | n/a | 2.5 |
| 1963 | n/a | n/a | 3.4 |
| 1973 | 4.7 | 0.4 | 5.1 |
| 1974 | 4.4 | 0.4 | 4.9 |
| 1975 | 3.7 | 0.4 | 4.1 |
| 1976 | 4.6 | 0.4 | 5.0 |

Source: Statistics Canada

n/a: not available.

These figures understate the actual growth of the industry because of greatly improved yields in processing and the growing utilization of former waste material such as logging and mill residues. Softwood species dominate production, accounting for well over 90 percent.

On a provincial basis, British Columbia is harvesting nearly half of Canada's total, most of which is processed initially for lumber and plywood. In contrast, Quebec and Ontario together make up one-third of the primary volume of forest production but the majority of this is classified as pulpwood. The Atlantic Provinces account for about 10 percent of total Canadian production and the Prairie Provinces the remaining 7 percent.

Annual Allowable Cut

A recent report, "Forest Management in Canada", prepared by F.L.C. Reed and Associates Ltd. (1978) for the Canadian Forestry Service, Environment Canada, estimates that the annual allowable cut of timber is currently about 9.1 billion cubic feet in Canada. Based on calculations made by provincial forest authorities this is the level of annual harvest which could be sustained indefinitely if existing standards of forest management and utilization were to continue. In comparison, Canada's average annual harvest has been estimated at 5.5 billion cubic feet or about 60 percent of the annual allowable cut. This estimate is based on average timber removals for the two peak production years in the 1973-1975 period and has been adjusted upward by F.L.C. Reed and Associates Ltd. to reflect differences between actual standards of utilization and those assumed in the allowable cut calculations.

The distribution of the allowable cut and the apparent physical reserve in the various provinces is shown in Table 56.

TABLE 56

Annual Allowable Cut, Average Harvest and Apparent Physical Reserve, By Province

(million cubic feet)

| | <u>Softwood Species</u> | | | | <u>Hardwood Species</u> | | | |
|----------------------|-------------------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------------------|-----------------------------|---------------------------|-----------------------------|
| | <u>Annual Allowable Cut</u> | <u>Average* Harvest</u> | <u>Percent of AAC</u> | <u>Physical Reserve</u> | <u>Annual Allowable Cut</u> | <u>Average* Harvest</u> | <u>Percent of AAC</u> | <u>Physical Reserve</u> |
| Newfoundland | 202 | 117 | 58 | 85 | 28 | 2** | 7 | 26 |
| Prince Edward Island | 8 | 5 | 63 | 3 | 6 | 2** | 33 | 4 |
| Nova Scotia | 113 | 114 | 101 | (1) | 51 | 22** | 43 | 29 |
| New Brunswick | 227 | 255 | 112 | (28) | 94 | 73** | 78 | 21 |
| Quebec | 1,464 | 899 | 61 | 565 | 404 | 331** | 82 | 73 |
| Ontario | 982 | 623** | 63 | 358 | 543 | 259** | 48 | 284 |
| Manitoba | 189 | 66 | 35 | 123 | 78 | 7 | 9 | 71 |
| Saskatchewan | 159 | 81 | 51 | 79 | 114 | 20** | 18 | 94 |
| Alberta | 402 | 229** | 57 | 173 | 478 | 10** | 2 | 468 |
| British Columbia | <u>3,509</u> | <u>2,407**</u> | <u>69</u> | <u>1,102</u> | <u>- ***</u> | <u>- ***</u> | <u>-</u> | <u>-</u> |
| CANADA**** | <u>7,255</u> | <u>4,796</u> | <u>66</u> | <u>2,459</u> | <u>1,796</u> | <u>726</u> | <u>40</u> | <u>1,070</u> |

Source: F.L.C. Reed and Associates Ltd., 1978 "Forest Management in Canada",
Department of Environment.

* Average harvest is the average of the best two years in the three-year period 1973-1975 and in some provinces has been adjusted to reflect prevailing utilization standards.

** Expressed as depletion to reflect actual standards of utilizations.

*** Included with softwoods species.

**** Does not include the Yukon and Northwest Territories.

It is important to note that the surplus timber shown in this table is a purely physical one and considerably overstates the size of reserve available for potential expansion in an economic sense. Much of this apparent surplus timber is located in highly remote areas that would be uneconomic to harvest at present cost/price levels or consists of secondary species such as poplar that because of problems associated with high processing costs and low market acceptability have not been fully utilized. In addition, these surplus figures include timber that is committed to individual companies but is beyond their industrial requirements at the present time.

Moreover, a report on forest policies in Canada prepared for the Canadian Council of Resource and Environment Ministers in 1976 suggests that the basic resource information on which allowable cuts are calculated is in many cases outdated, inaccurate, or incomplete and there are difficulties with consistency or comparability of available data across the country. Principal deficiencies are lack of data on timber quality, growth, losses due to fire, insects and disease and economic accessibility. Such information is essential for effective long-term planning in forest management and industrial development. Several provinces are re-assessing their sustained yield capability in the light of the latest inventory data, recent losses to the spruce budworm and other insect infestation and withdrawals due to newly imposed environmental guidelines.

These factors coupled with current harvests at or in excess of the allowable cuts in New Brunswick, Nova Scotia, and parts of Ontario, Quebec and British Columbia raise considerable uncertainties as to the opportunity for expansion without significant real changes in cost/price structures.

Forest Management

Considerable attention is now focusing on intensive forest management practices as a means of increasing the yield and allowable cut on Canada's forest land. Among these are more rapid regeneration of cutover acreages, use of genetically improved stock, juvenile spacing, fertilization and greater protection from insects, disease and fire. On the one hand, competing softwood regions in the United States, Northern Europe and elsewhere are investing relatively large sums in their forests. On the other hand, emerging timber shortages are forcing Canadians to examine their own record.

Millions of acres of our more accessible forest lands have not been systematically restocked. Forestry operations now cover 2.8 million acres annually and current annual reforestation programs cover only 400,000 acres. Fires burn over about two million acres yearly and much of this does not restock adequately. During the past few years the spruce budworm has killed vast amounts of softwood timber in Central and Eastern Canada, thereby threatening the timber supply of many manufacturing plants.

Given the supply problems referred to above and the example set by our main competitors, it is imperative that a higher priority be assigned to forestry investments in Canada. In addition to more intensive management of readily accessible forest sites, there is also considerable scope for extending Canada's timber supplies through better utilization of existing stands, greater use of logging and mill residues and improved processing yields. The merits of opening up and developing the more remote timber lands should also be given special consideration in view of the significant social and economic benefits that could be achieved in these remote areas.

INDUSTRIAL ORGANIZATION

The forest products industry has undergone major changes during the last decade. The trend has been towards increased horizontal and vertical integration in response to changes in technology, capital requirements, raw material utilization, provincial forest policies and the need to remain competitive in world markets. Many companies are systematically diversifying their product lines and geographical base of operation through mergers, acquisitions and internal growth. Independent companies in the various product sectors are also becoming increasingly interdependent through integrated utilization of fibre supplies and contractual marketing arrangements.

Structure of the Industry

While the influence of large, fully-integrated, and in some cases, multi-national companies has been steadily increasing, the forest industry still includes a large number of small, single-product firms. In the wood products industries, for example, over 1,000 companies with assets under \$5 million collectively account for about one-half of total wood product shipments. The remaining half of industry shipments originates in 94 companies with assets over \$5 million. Pulp and paper companies tend to be larger because of the capital intensive nature of that sector of the industry. Despite the large size of firms, corporate power in the pulp and paper industry is diffused and has not become more concentrated during the past two decades.

Small firms in the industry are usually owned by individuals or families and the larger firms are generally public Canadian companies or subsidiaries of foreign companies.

The forest products industries are becoming highly integrated to achieve economies of scale, reduce overall fibre costs and improve production and marketing efficiency. Allocation of logs and residual by-products to the most appropriate end-use has become increasingly necessary in order to offset escalating wood costs and to conform to provincial utilization standards. The technological advances achieved in small-log conversion plants has reinforced this trend. Integration of raw material procurement and manufacturing facilities has been well established in British Columbia for many years and major advances towards this end have been accomplished in Central Canada with the recent expansion of many pulp and paper companies in sawmilling.

Changes in technology, together with the application of environmental and resource policies by government, have increased the minimum average plant size needed for efficient operations. The capital now required for construction of new facilities or even to maintain existing operations and to meet environmental regulations is invariably large and in the case of new pulp mills exceeds the

financial capabilities of all but the largest companies. Moreover, the availability of uncommitted timber reserves (especially softwood) to support new resource development is declining, particularly for large scale pulp mills. As a result, future expansion in the forest industry is expected to be increasingly limited to existing firms and new entrants which are large and well financed.

Forward integration including co-operative marketing arrangements has become a major requirement for successful market penetration, especially offshore. Canadian companies through joint ventures, acquisitions, or subsidiaries have established specialized transportation systems and marketing organizations in the U.S. and Europe which have enabled them to effectively compete in these markets. Many smaller producers have also utilized the services offered by these larger organizations to expand their market opportunities.

Concentration of Production

Although the size of individual companies has been increasing, Canadian forest products companies are not large by world standards. Only six Canadian companies are included in the top 100 forest products companies in the world. Ranked according to 1976 sales, MacMillan Bloedel, Canada's largest forest products company, was twelfth followed by Domtar nineteenth, Abitibi-Price twentieth, Consolidated-Bathurst twenty-sixth, B.C. Forest Products fiftieth and Canadian Cellulose ninetieth. It is important to note that the top 11 companies in the world (nine U.S. and two British) all have subsidiary operations in Canada. In comparison to other industrial sectors, only nine forest products companies were included in the 1976 Financial Post listing of top 100 industrial companies in Canada, and four of these were subsidiaries of foreign companies.

The production of forest products has remained highly fragmented in Canada as many new producers have entered the industry during the last decade. The degree of concentration for the major products is shown in Table 57.

TABLE 57

Share of Production by the Top Five Firms, 1964-74

| | (percent) | |
|----------------------------|-------------|-------------|
| | <u>1964</u> | <u>1974</u> |
| Lumber | 21 | 23 |
| Newsprint | 54 | 62 |
| Pulp for sale | 44 | 30 |
| Paperboard | 67 | 60 |
| Printing and writing paper | 80 | 79 |

Source: Canadian Pulp and Paper Association
Department of Industry, Trade and Commerce

Rationalization

Since Canada is subject to intense competition from foreign producers in both domestic and world markets, the forest products industry is under continuing pressure to reduce costs and remain internationally competitive. While significant progress towards an efficient industry structure has been made in recent years, it is clear that further improvements in resource utilization and productivity performance will be required to offset major increases in raw material and operating costs and to achieve a better balance between conversion capabilities and available fibre supplies. For some product sectors, such as particleboard and fine papers, re-organization or restructuring of existing operations appears to be essential if they are to remain viable over the longer term.

Rationalization has been identified as a principal requirement for improving manufacturing and marketing efficiency to achieve effective cost reductions. It involves the possible closing of obsolescent mills, re-allocation of fibre supplies, modernization programs, mergers, acquisitions and market sharing arrangements such as export and specialization agreements.

While expansion through new facilities is essential in the long term to maintain Canada's share of domestic and world markets, optimization of existing facilities represents the most economical means of increasing capacity and productivity in the short term for some products. The cost of incremental capacity through optimization* of existing newsprint mills has been estimated to be from one-half to two-thirds the cost of new capacity. Moreover, incremental capacity improvements tend to be less disruptive of supply/demand balances than new large-scale mills. Optimization has been a continuing industry program, but despite this facilities on average are becoming older, and productivity improvements are not keeping pace with Canada's major competitors. This has become a particular area of concern in the B.C. Coast lumber and plywood industry and in some of the older newsprint mills in Central and Eastern Canada.

While a major part of Canada's primary production originates from world-scale mills, there is still considerable scope for achieving greater economies of scale and specialization in some product sectors, particularly in higher valued products. Efficiency in the fine paper industry, for example, is sharply reduced by the broad range of grades produced in short production runs on small production units. Substantial cost reductions and improved manufacturing efficiency

* Optimization includes modernization, where appropriate, and other means of improving production facilities and increasing capacity. The term is more completely defined in the profiles on newsprint and pulp.

could result from specialization in certain grades or replacement of the numerous small machines now in operation with a fewer number of large modern machines. Achievement of these efficiency gains through mergers or specialization agreements will require accommodation under Canadian competition policy and improved access to U.S. markets.

Rationalization viewed as a geographic concept can affect any or all of the activities of the industry in a geographic area from the harvesting of wood to the marketing of the finished products. A pilot study, recently completed under the aegis of the Federal/Provincial Forest Industries Development Committee (FIDC), has been undertaken in New Brunswick to define the problems that might be met in a rationalization program.

Foreign Ownership

Foreign investment in the Canadian forest products industry has been directed largely towards expansion of existing facilities and new greenfield development. Major take-overs of Canadian-controlled companies have not been significant in recent years.

Foreign-owned companies accounted for about 44 percent of total sales in the paper and allied industries in 1976 (Corporation and Labour Unions Returns Act). Most of this control is held by U.S. and, to a lesser extent, European and Japanese multi-nationals who have invested for the most part in bulk commodity products such as pulp and newsprint. The fine paper industry is almost exclusively Canadian-owned.

Foreign ownership in the wood industries is mainly in panel products and to a lesser extent softwood lumber, and accounted for about 26 percent of total sales by wood product companies with assets over \$5 million in 1976.

Sales and profitability of Canadian companies and foreign subsidiaries are shown Table 58.

TABLE 58

Ownership of Companies with Assets Over \$5 Million, 1976

| | <u>Foreign</u> | <u>Canadian</u> | <u>Total</u> |
|--------------------------------------|----------------|-----------------|--------------|
| <u>Wood Industries</u> | | | |
| Number of companies | 36 | 97 | 133 |
| Sales (\$ million) | 703 | 1,976 | 2,679 |
| Profitability* | 8% | 8% | - |
| Debt/equity | 29% | 37% | - |
| <u>Paper & Allied Industries</u> | | | |
| Number of companies | 58 | 62 | 120 |
| Sales (\$ million) | 3,744 | 4,809 | 8,553 |
| Profitability* | 8% | 4% | - |
| Debt/equity | 28% | 37% | - |

Source: Statistics Canada; Corporation and Labour Unions Returns Act

* Net profit before tax/capital employed (debt and equity).

PRODUCTIVITY

The successful development of export markets has enabled the primary sectors of Canada's forest industry to expand and to achieve economies of scale and specialization that would not have been forthcoming if operations were restricted to the smaller domestic market. This strong export-orientation has, however, subjected the sector to the discipline of international competition. Continuing growth and long-term viability of the forest industry in Canada will only be assured if Canadian companies are able to achieve profitability and productivity levels comparable to those of other suppliers, particularly U.S. producers.

Productivity measures have been calculated for four major industry segments: logging, sawmills and planing mills, veneer and plywood mills and pulp and paper mills. The average annual percentage increases shown in the following tables are derived from Statistics Canada data and, with the exception of pulp and paper, are for the years 1964 to 1976, the latest year for which comparable data is available. The years 1964 to 1974 were selected for pulp and paper as being more indicative of long-term trends because of the abnormal market conditions prevailing in 1975 and 1976. It should be noted that the major downturn in lumber and plywood markets in 1974 and 1975 has also resulted in some distortion of the figures in these sectors.

Real output per manhour has been used as a proxy for productivity, recognizing that this measure includes the contributions made by all factors of production including capital, improved managerial techniques, and changes in technology as well as those directly attributable to labour.

Subject to yearly fluctuations, all four industry segments have experienced real growth in output over the period under consideration while at the same time the total number of manhours paid has remained relatively constant or has declined. In addition to general inflationary pressures the comparatively high rate of growth of average wages in logging and the wood product industries also reflects a structural shift towards higher skill requirements in the labour force of these industries. The increase in average wage rates expressed in current dollars has outstripped these productivity gains although hourly wages as a proportion of value-added per manhour has remained more or less the same.

Logging

Productivity in the logging sector increased at an annual rate of 6.3 percent between 1964 and 1976, reflecting technological change and increased mechanization in the woods. This high rate of productivity growth will not likely be sustained in future years as the industry has already achieved a high degree of mechanization compared with earlier years and further gains will likely require major expenditures for the development of new technology. Moreover, the declining size and quality of remaining timber stands will also have a negative impact on productivity. It is interesting to note that value-added per manhour in logging surpasses that existing in the lumber and plywood industries demonstrating the capital intensive nature of current logging operations. Despite this excellent productivity performance, delivered wood costs have increased rapidly since 1972 and the upward pressure on logging costs still remains strong.

TABLE 59

Indexes of Productivity in Logging in Canada, 1964-76

| | Index Real Output* | Index Manhours Paid | Index Output/ Manhour | Value Added/ Manhour | Average Wage |
|------|--------------------------|---------------------------|-----------------------------|-------------------------|-----------------|
| 1964 | 100 | 100 | 100 | \$ 3.77 | \$ 2.06 |
| 1965 | 101 | 96 | 105 | 4.31 | 2.24 |
| 1966 | 106 | 97 | 109 | 4.82 | 2.45 |
| 1967 | 105 | 91 | 115 | 5.31 | 2.69 |
| 1968 | 110 | 80 | 137 | 6.31 | 2.96 |
| 1969 | 119 | 82 | 144 | 6.99 | 3.26 |
| 1970 | 118 | 79 | 150 | 6.81 | 3.44 |
| 1971 | 117 | 70 | 167 | 7.73 | 3.87 |
| 1972 | 121 | 70 | 172 | 9.09 | 4.26 |
| 1973 | 140 | 83 | 170 | 10.36 | 4.88 |
| 1974 | 135 | 85 | 159 | 11.27 | 5.55 |
| 1975 | 113 | 77 | 147 | 11.29 | 6.02 |
| 1976 | 137 | 66 | 208 | 15.84 | 7.61 |

Average Annual Rates (percent)

| | | | | | |
|---------|-----|--------|-----|------|------|
| 1964-76 | 2.7 | -(3.4) | 6.3 | 12.7 | 11.5 |
|---------|-----|--------|-----|------|------|

Source: Department of Industry, Trade and Commerce

* Volume of wood harvested.

Sawmills and Planing Mills

Real output per manhour in sawmills and planing mills grew at an annual rate of 3.5 percent from 1964 to 1976, reflecting the shift in production from small mills to larger, more efficient production units and the increased use of high volume, small-log processing systems in the industry. Moreover, the increased sales of residual by-products such as pulp chips, have had a significant impact on real output and productivity. Productivity declined slightly in 1972 and 1973 despite a substantial increase in real output during these years. This is probably due to a distortion in the industry aggregate figures caused by the reactivation of numerous small mills to take advantage of the booming market conditions prevailing at that time. The sharp decline in lumber production in 1974 and 1975 does not appear to have had much of an impact on productivity as the number of manhours paid was reduced more or less in line with the cutback in production. Domestic and export demand for Canadian lumber recovered in 1976 and production is currently at record levels although markets for sawmill pulp chips have continued to be weak.

TABLE 60

Indexes of Productivity in Sawmills and Planing Mills in Canada, 1964-76

| | <u>Index Real Output*</u> | <u>Index Manhours Paid</u> | <u>Index Output/ Manhour</u> | <u>Value Added/ Manhour</u> | <u>Average Wage</u> |
|------|-----------------------------------|------------------------------------|--------------------------------------|---------------------------------|-------------------------|
| 1964 | 100 | 100 | 100 | \$ 3.96 | \$ 1.85 |
| 1965 | 102 | 103 | 100 | 4.03 | 1.97 |
| 1966 | 101 | 99 | 102 | 4.20 | 2.12 |
| 1967 | 103 | 97 | 105 | 4.45 | 2.26 |
| 1968 | 108 | 98 | 110 | 5.87 | 2.45 |
| 1969 | 111 | 101 | 110 | 5.83 | 2.65 |
| 1970 | 119 | 96 | 124 | 4.85 | 2.91 |
| 1971 | 126 | 99 | 127 | 6.14 | 3.27 |
| 1972 | 139 | 110 | 126 | 8.41 | 3.60 |
| 1973 | 146 | 119 | 123 | 11.39 | 4.06 |
| 1974 | 146 | 110 | 133 | 9.43 | 4.73 |
| 1975 | 127 | 90 | 141 | 10.00 | 5.45 |
| 1976 | 163 | 108 | 151 | 12.51 | 6.36 |

Average Annual Rates (percent)

| | | | | | |
|---------|-----|-----|-----|------|------|
| 1964-76 | 4.2 | 0.6 | 3.5 | 10.1 | 10.8 |
|---------|-----|-----|-----|------|------|

Source: Department of Industry, Trade and Commerce.

* Total value of shipments deflated by the price index for sawmill and planing mills.

Veneer and Plywood

Real output per manhour in the veneer and plywood industry increased at an annual rate of 3.3 percent from 1964 to 1976. Performance in this industry is mixed as the efficiency gains generated by the new sheathing plywood mills in the B.C. Interior and east of the Rockies have been offset somewhat by declining productivity in some of the older plywood mills on the B.C. Coast. Modernization of some of these facilities is either planned or under way at the present time which should result in a major upswing in productivity on the B.C. Coast over the coming years. Similar to the lumber situation, production of softwood plywood is currently at record levels following severely depressed market conditions in 1974 and 1975. Based on the proportion of wages per value added, the veneer and plywood industry appears to be the most labour-intensive industry segment of the four.

TABLE 61

Indexes of Productivity in Veneer and Plywood Mills in Canada, 1964-76

| | <u>Index Real Output*</u> | <u>Index Manhours Paid</u> | <u>Index Output/ Manhour</u> | <u>Value Added/ Manhour</u> | <u>Average Wage</u> |
|------|-----------------------------------|------------------------------------|--------------------------------------|---------------------------------|-------------------------|
| 1964 | 100 | 100 | 100 | \$ 3.57 | \$ 1.91 |
| 1965 | 105 | 105 | 100 | 3.68 | 2.01 |
| 1966 | 113 | 106 | 107 | 3.82 | 2.19 |
| 1967 | 116 | 99 | 117 | 4.48 | 2.37 |
| 1968 | 122 | 98 | 124 | 4.89 | 2.64 |
| 1969 | 116 | 95 | 122 | 5.57 | 2.88 |
| 1970 | 110 | 83 | 133 | 4.79 | 3.15 |
| 1971 | 119 | 89 | 134 | 5.95 | 3.42 |
| 1972 | 127 | 95 | 134 | 7.34 | 3.73 |
| 1973 | 136 | 102 | 133 | 8.51 | 4.14 |
| 1974 | 115 | 90 | 128 | 8.39 | 4.75 |
| 1975 | 110 | 82 | 134 | 9.38 | 5.56 |
| 1976 | 132 | 89 | 148 | 11.49 | 6.33 |

Average Annual Growth Rates (percent)

| | | | | | |
|---------|-----|-------|-----|------|------|
| 1964-76 | 2.3 | (1.0) | 3.3 | 10.2 | 10.5 |
|---------|-----|-------|-----|------|------|

Source: Department of Industry, Trade and Commerce.

* Total value of shipments deflated by the price index for veneer and plywood mills.

Pulp and Paper

Real output per man hour in pulp and paper mills increased at an average annual rate of 4.1 percent between 1964 and 1974 which is slightly below the rate of growth recorded by the pulp and paper industry in the United States over the same period. Output per man hour subsequently declined in 1975 and 1976 in both Canada and the United States due to weak market conditions and low operating ratios. The widespread work stoppages in the Canadian industry in 1975 and the early part of 1976 also had a negative impact on production levels during this period. While the demand for Canadian newsprint recovered in 1976 and is remarkably strong at the present time, market conditions for pulp were weak until 1978. Operating rates are a major factor affecting productivity performance in the pulp and paper industry and, although highly variable due to fluctuating market conditions, are significantly higher in the United States than in Canada over the market cycle. However, even compared to other forest industries in Canada, the value added per manhour in the Canadian pulp and paper industry still does not fully reflect the significantly greater net capital stock position of the industry despite the major increase in this ratio since 1972.

TABLE 62

Indexes of Productivity in Pulp and Paper Mills in Canada, 1964-76

| | Index Real Output* | Index Manhours Paid | Index Output/ Manhour | <u>Operating Ratio</u> | | Value Added/ Manhour | Average Wage |
|------|--------------------------|---------------------------|-----------------------------|------------------------|-------------|-------------------------|-----------------|
| | | | | <u>Newsprint</u> | <u>Pulp</u> | | |
| 1964 | 100 | 100 | 100 | 88% | 89% | \$ 8.00 | \$ 2.52 |
| 1965 | 105 | 102 | 103 | 92% | 90% | 8.07 | 2.65 |
| 1966 | 113 | 108 | 105 | 95% | 91% | 8.15 | 2.89 |
| 1967 | 111 | 107 | 104 | 87% | 84% | 7.83 | 3.08 |
| 1968 | 118 | 105 | 112 | 83% | 83% | 8.21 | 3.32 |
| 1969 | 129 | 110 | 118 | 91% | 87% | 9.17 | 3.56 |
| 1970 | 129 | 107 | 121 | 89% | 84% | 9.85 | 3.81 |
| 1971 | 128 | 104 | 123 | 83% | 80% | 9.73 | 4.18 |
| 1972 | 140 | 105 | 133 | 86% | 85% | 10.46 | 4.52 |
| 1973 | 154 | 105 | 146 | 88% | 91% | 13.70 | 4.90 |
| 1974 | 171 | 114 | 150 | 95% | 89% | 21.23 | 5.62 |
| 1975 | 127 | 94 | 135 | 76% | 67% | 21.92 | 6.44 |
| 1976 | 147 | 111 | 132 | 91% | 78% | 20.40 | 7.41 |

Average Annual Growth Rates (percent)

| | | | | | | | |
|---------|-----|-----|-----|---|---|------|-----|
| 1964-74 | 5.5 | 1.3 | 4.1 | - | - | 10.3 | 6.9 |
|---------|-----|-----|-----|---|---|------|-----|

Source: Canadian Pulp and Paper Association
Department of Industry, Trade and Commerce.

* Total value of shipments deflated by the price index for pulp and paper mills.

PROFITABILITY

Problems associated with profitability and lack of cash flow have been among the most fundamental and critical facing the industry. Profitability and cash flow are fundamental in that they affect most other issues; they are critical in that they determine investment, and delays in modernization can result in a loss of competitive position, lost markets and further reductions in future profitability and cash flow.

Profits are a function of sales volume, prices and costs. These in turn reflect the markets, business cycles, factors affecting prices, efficiency of operations and other cost factors. Many of these are beyond control; others may be influenced to varying degrees.

While the shift in exchange rates has significantly increased profits and cash flows in 1977 and 1978, on a historical basis profits in the Canadian forest products industry have been relatively low and variable. On the basis of comparison with other industries, forest industry investments should produce consistently higher levels of return. Consistently higher profitability would stimulate investment and improve the ratings of forest product companies in industrial bond markets.

As set forth in Tables 63 and 64, after tax profits as a percentage of capital employed (long-term debt and equity) in the forest industry have been below the total manufacturing industry average in all years between 1965 and 1976. A percentage comparison of the returns on capital employed in the forest sector and total manufacturing shows ratios ranging from 27 to 88 percent during the period. With the exception of 1974, the same pattern holds for after-tax profits as a percent of shareholders' equity, although the forest industry compares more favourably using this particular ratio because of higher-than-average levels of debt in its capital structure.

TABLE 63

After-Tax Profits as a Percent of Capital Employed

| <u>Year</u> | <u>Pulp & Paper</u> | <u>Wood</u> | <u>Total Forest Industry</u> | <u>Total All Mfg.</u> | <u>Forest Industry as a % Total Mfg.</u> |
|-------------------|-----------------------------|-------------|----------------------------------|---------------------------|--|
| 1965 | 7.1 | 3.8 | 6.4 | 8.0 | 80 |
| 1966 | 7.4 | 4.1 | 6.7 | 7.7 | 87 |
| 1967 | 3.6 | 2.1 | 3.3 | 6.2 | 53 |
| 1968 | 3.4 | 6.2 | 3.9 | 6.7 | 58 |
| 1969 | 4.4 | 5.3 | 4.6 | 6.9 | 67 |
| 1970 | 2.4 | -1.1 | 1.6 | 4.9 | 33 |
| 1971 | 1.5 | 2.3 | 1.7 | 6.4 | 27 |
| 1972 | 1.1 | 6.4 | 2.1 | 7.5 | 28 |
| 1973 | 4.7 | 14.2 | 6.9 | 10.0 | 69 |
| 1974 | 11.4 | 7.5 | 10.4 | 11.8 | 88 |
| 1975 | 5.2 | 4.5 | 5.0 | 9.4 | 53 |
| 1976 | 4.2 | 8.0 | 5.1 | 8.3 | 61 |
| Period Average | 4.7 | 5.4 | 4.8 | 7.8 | 61 |

Source: Statistics Canada.

TABLE 64

After-Tax Net Profits as a Percent of Shareholders' Equity

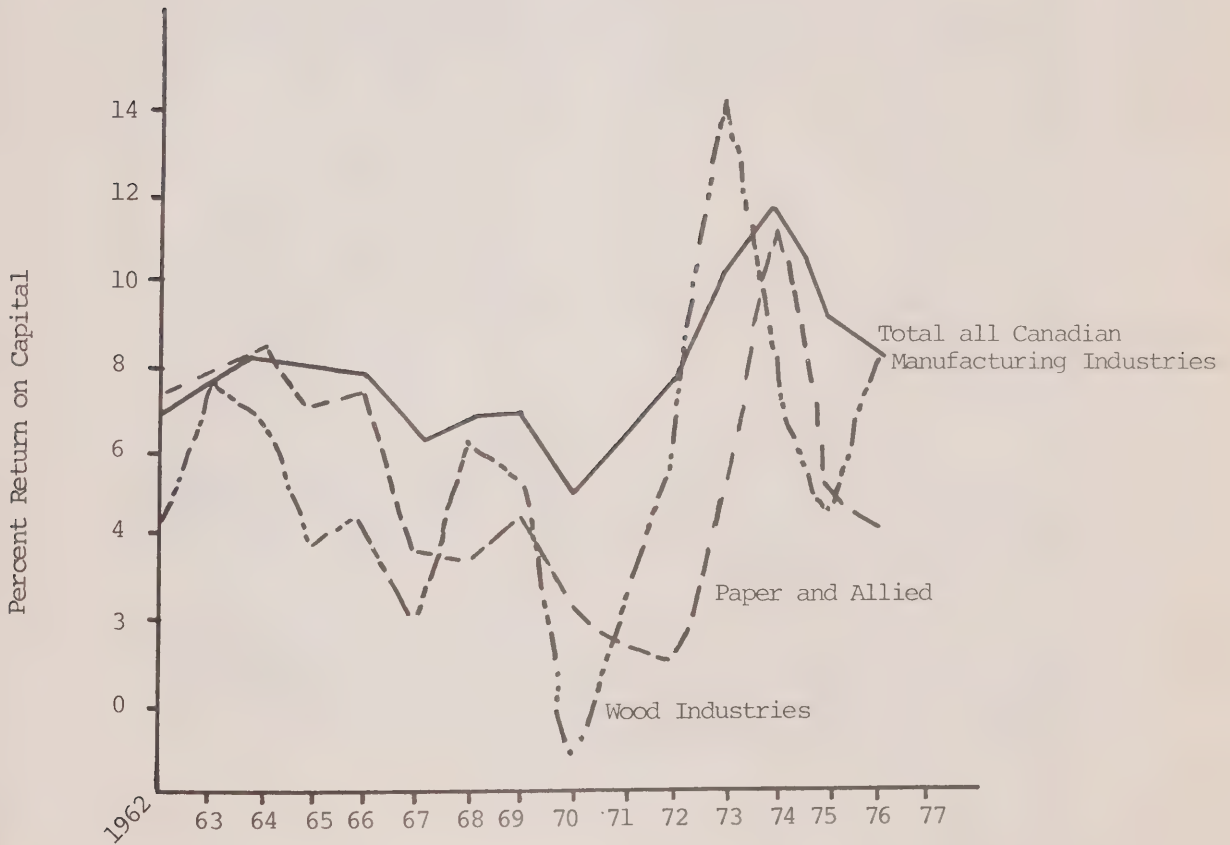
| <u>Year</u> | <u>Pulp & Paper</u> | <u>Wood</u> | <u>Total Forest Industry</u> | <u>Total All Mfg.</u> | <u>Forest Industry as a % Total Mfg.</u> |
|-------------|-----------------------------|-------------|----------------------------------|---------------------------|--|
| 1965 | 10.5 | 6.7 | 9.8 | 11.1 | 88 |
| 1966 | 11.6 | 7.5 | 10.8 | 11.0 | 98 |
| 1967 | 6.1 | 3.8 | 5.6 | 9.2 | 61 |
| 1968 | 5.8 | 11.1 | 6.9 | 10.0 | 69 |
| 1969 | 7.8 | 9.5 | 8.1 | 10.2 | 79 |
| 1970 | 4.3 | -2.0 | 3.0 | 7.4 | 41 |
| 1971 | 3.0 | 4.2 | 3.2 | 9.5 | 34 |
| 1972 | 2.0 | 11.3 | 4.0 | 11.1 | 36 |
| 1973 | 8.5 | 24.5 | 12.4 | 14.5 | 86 |
| 1974 | 20.5 | 12.8 | 18.7 | 16.7 | 112 |
| 1975 | 9.1 | 7.6 | 8.7 | 13.5 | 64 |
| 1976 | 7.5 | 13.3 | 8.7 | 12.1 | 72 |
| Period | | | | | |
| Average | 8.1 | 9.2 | 8.3 | 11.4 | 73 |

Source: Statistics Canada

As illustrated in the following chart, there are considerable yearly fluctuations in the Canadian forest industry's profitability. This is caused by the cyclical aspects of market price and demand and contributes to the uncertainty of all aspects of future development, including planning and investing. The profit fluctuations are even greater when considered on a specific product basis, since business cycles for different product categories do not always coincide but tend to offset one another when averaged in broad industry groupings.

PROFITABILITY

Return on Capital Forest Industry 1962-1977



Canadian forest industry profits are not only significantly below those in the United States but also more cyclical. This greater variability is due in part to the marginal supply of Canadian products in the U.S. market vis-à-vis those from U.S. producers.

Table 65 compares levels of profitability for the United States and Canadian forest industries.

TABLE 65

After-Tax Profits as a Percent of Shareholders' Equity

| <u>Year</u> | <u>Canada</u> | <u>United States</u> |
|-------------|---------------|----------------------|
| 1970 | 3.0 | 6.6 |
| 1971 | 3.2 | 7.0 |
| 1972 | 4.0 | 11.0 |
| 1973 | 12.4 | 16.0 |
| 1974 | 18.7 | 14.6 |
| 1975 | 8.7 | 10.6 |
| 1976 | 8.7 | 13.8 |
| Period | | |
| Average | 8.4 | 11.4 |

Source: Statistics Canada
United States Department of Commerce

A comparison of large integrated firms, i.e., selected Canadian multi-nationals with their United States counterparts, indicates an even greater profitability advantage for U.S. firms, particularly those firms owning timber.

Without providing for the effects of inflation, profitability for the five-year period from 1973 to 1977 is above the industry average since 1965. Ratios of profitability and cash flow for 10 large, integrated Canadian forest products firms, during that period, are presented in Table 66.

TABLE 66

Ratios of Profitability and Cash FlowTen Integrated Canadian Forest Products FirmsAverages for 1973 to 1977

| | 1977 Sales (\$000) | After-Tax Profits | | | Cash Flow | | |
|-------------------------|--------------------------|---------------------|-----------------------------------|--------------------------------------|---------------------|-----------------------------------|--------------------------------------|
| | | Percent of Sales | Percent of Capital Employed | Percent of Shareholders Equity | Percent of Sales | Percent of Capital Employed | Percent of Shareholders Equity |
| Abitibi* | 1,045,504 | 4 | 5 | 10 | 8 | 11 | 21 |
| B.C. Forest Products | 491,949 | 7 | 9 | 16 | 14 | 16 | 30 |
| Consolidated-Bathurst | 868,865 | 4 | 8 | 13 | 8 | 14 | 24 |
| Crown Zellerbach Canada | 438,900 | 6 | 10 | 12 | 11 | 19 | 23 |
| Domtar** | 1,018,500 | 5 | 8 | 12 | 9 | 17 | 24 |
| Fraser | 212,490 | 8 | 10 | 12 | 13 | 18 | 22 |
| Great Lakes Paper | 241,448 | 7 | 8 | 16 | 19 | 21 | 44 |
| MacMillan Bloedel | 1,714,800 | 3 | 5 | 8 | 8 | 14 | 22 |
| Price | 383,148 | 5 | 6 | 7 | 10 | 13 | 16 |
| Weldwood | 386,700 | 3 | 8 | 11 | 7 | 16 | 23 |
| ALL FIRMS | 6,802,304 | 4 | 7 | 11 | 9 | 15 | 23 |

Source: Company Annual Reports

* Consolidated Statements of Abitibi Paper provide for 58 percent ownership of Price.

** Domtar receives considerable revenue from sales of products other than forest products.

Combined 1977 sales for these 10 companies exceeded \$6 billion. For the five years to 1977, their ratios of net profit to sales, expressed as a percentage, ranged between 3 and 8 percent, averaging only 4 percent. Net profit to capital employed ranged between 5 and 10 percent, averaging 7 percent, and net profit to shareholder's equity ranged between 7 and 16 percent, averaging 11 percent. Cash flow (after-tax profits plus non-cash expenses such as depreciation and depletion) ratios were proportionately higher.

As set out in the earlier profitability tables, book profits for the industry have tended to improve since 1973 but these are misleading because they are based on traditional methods of accounting which do not provide for the effects of inflation on assets and liabilities. Profits tend to be overstated in comparison with those in prior periods of lower inflation. Moreover, the additional capital needed to maintain inventory, plant and equipment at the same level of operation is not fully reflected in conventional financial statements.

The accounting profession is examining alternative methods of inflation accounting. The Report of the Ontario Committee on Inflation recommended the disclosure of the effects of inflation on financial statements as an interim measure until a comprehensive method of inflation accounting can be adopted. According to this report, the profits of forest products and chemical companies for the period 1971 to 1975 were reported as \$1.39 billion, whereas on an inflation-adjusted basis they were about \$250 million.

Using the approach set out in the above report, several of the integrated Canadian forest products firms have included in their 1977 annual reports calculations showing the effects of inflation on funds available for distribution or expansion. All of these comparisons have indicated a significant overstatement of available funds using generally accepted accounting principles.

CAPITAL

The financial aspects of company operations are becoming increasingly critical. Poor profit performance on a historical basis coupled with substantial cost inflation could jeopardize future investment. The cost of new mills in the capital intensive sectors of the industry have almost tripled over the last decade. The interest cost of new borrowings is up 70 percent over the same period. Yet, the ability of the industry to undertake investment in new and replacement facilities is critical to effective competition in world markets and to continued development of forest resources.

Investment and Capital Requirements

Throughout the forest products industry, many existing mills were constructed decades ago. Although these facilities have been upgraded and maintained to varying degrees, the industry requires further investment to help keep pace with productivity and cost improvements being made elsewhere.

Table 67 presents forest industry capital expenditures in current dollars from 1970 to 1977 and intentions for 1978 but does not include capital expended in the forestry sector. Statistics Canada reported capital expenditures in this sector of \$382 million and \$435 million for 1976 and 1977 respectively, up significantly in recent years because of the emphasis on mechanization. These expenditures are largely for road construction and harvesting equipment.

TABLE 67

Capital Expenditures

(\$ millions)

| | <u>Pulp and Paper</u> | | | <u>Wood Industries</u> | | | <u>Total Forest Industry (excluding forestry)</u> | | |
|--------|-----------------------|----------------|--------------|------------------------|----------------|--------------|---|----------------|--------------|
| | <u>Mach.</u> | <u>Constr.</u> | <u>Total</u> | <u>Mach.</u> | <u>Constr.</u> | <u>Total</u> | <u>Mach.</u> | <u>Constr.</u> | <u>Total</u> |
| 1970 | 399 | 133 | 532 | 102 | 42 | 144 | 501 | 175 | 676 |
| 1971 | 402 | 134 | 528 | 116 | 37 | 154 | 519 | 171 | 692 |
| 1972 | 332 | 117 | 448 | 132 | 41 | 173 | 463 | 158 | 621 |
| 1973 | 313 | 89 | 403 | 200 | 76 | 277 | 513 | 166 | 680 |
| 1974 | 434 | 121 | 554 | 202 | 86 | 288 | 636 | 206 | 842 |
| 1975 | 467 | 110 | 577 | 193 | 74 | 266 | 660 | 184 | 843 |
| 1976 | 560 | 129 | 689 | 189 | 61 | 250 | 749 | 190 | 939 |
| 1977* | 610 | 175 | 785 | 182 | 73 | 255 | 792 | 248 | 1,040 |
| 1978** | 635 | 141 | 776 | 210 | 66 | 176 | 845 | 207 | 1,052 |

Source: Statistics Canada

* Preliminary actual.

** Intentions.

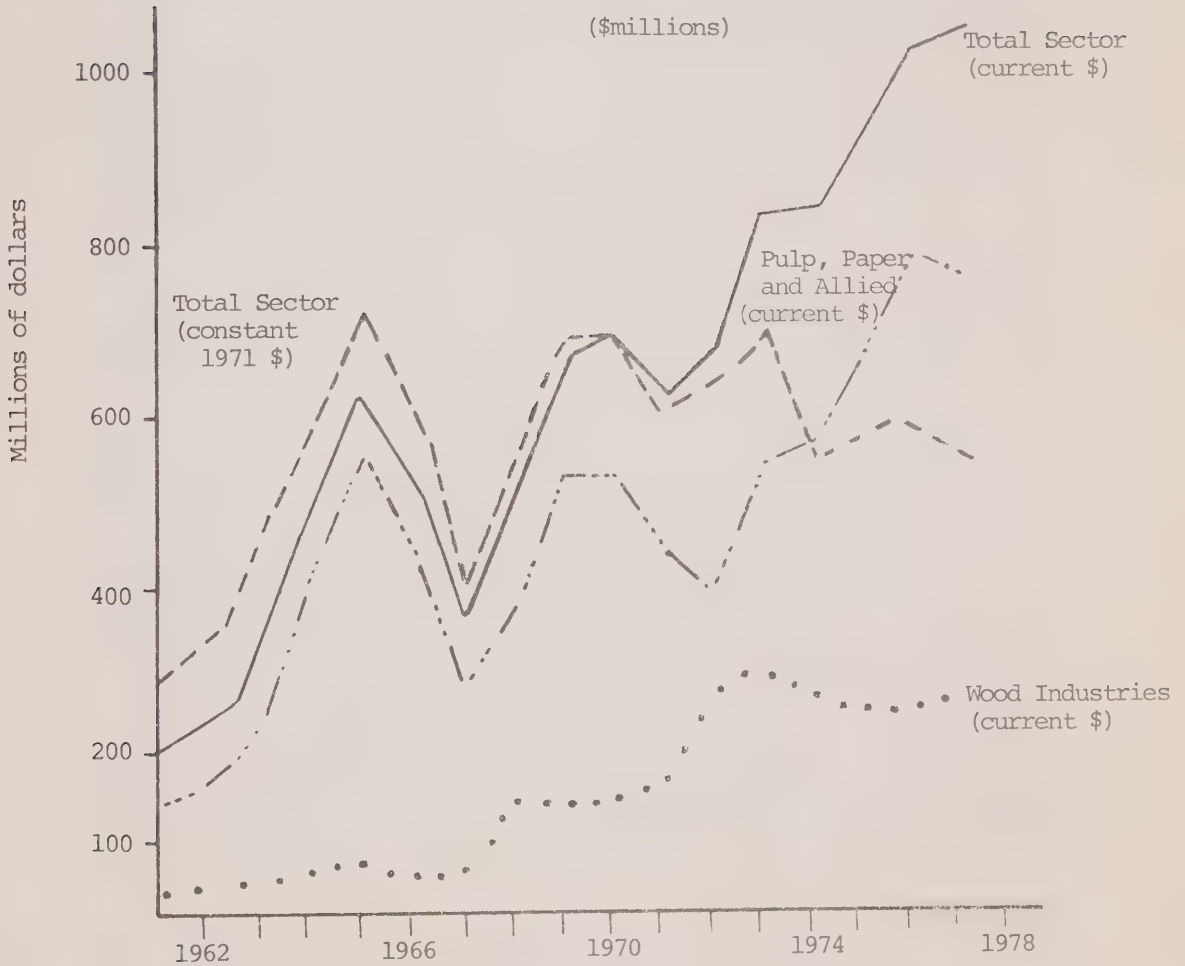
In current dollars, the expenditures of \$785 million in pulp and paper in 1977 and \$288 million in the wood industries in 1974 were at an all-time high. In real terms, however, the overall trend since 1970 is downward as prices for machinery and construction have moved sharply upward.

As illustrated in the table but more clearly in the following chart, total industry capital expenditures have increased erratically in current terms during the period, but investments in pulp, newsprint and a large segment of the plywood industry have declined in real terms. Investment in the capital-intensive pulp and paper industry has in recent years concentrated on increasing capacity of existing mills through machine speedups and equipment replacement rather than on the construction of new mills. There have been some new capacity increases in lumber and other panel products with DREE support, but much of this has been an attempt to reduce costs through integration with pulp manufacturing facilities and utilization of wood residues, despite uncertain markets and apparent overcapacities at the time of construction.

CAPITAL SPENDING BY FOREST INDUSTRIES

1962 - 1978

(\$millions)



In terms of future capital investment intentions, there have been some encouraging indications of large scale corporate modernization programs within a number of key Canadian forest industry firms.

For the forest products industry generally, the costs of investment tend to be higher in Canada than in major competing regions. It is estimated, for example, that a newsprint or pulp mill will cost 5 to 15 percent more in Canada than in the southern United States. In the forestry sector, the Canadian Forestry Service estimates that Canadian producers have paid on the average 15 percent more for the same basket of forestry machinery and equipment than their competitors in the United States and 37 percent more than in Finland.

The rapid escalation of capital costs has created a structural shift in the return on investment process for most of the industry but particularly for the pulp and paper component. With rising product prices, the older facilities, providing they are efficient, yield higher returns on their relatively lower book values than do newer, more expensive facilities. This explains the decline in investment for new mill and major replacement facilities and the reason for emphasis on investment for upgrading the productivity of existing facilities. The benefits of upgrading are (1) greater returns on investment in projects designed to reduce operating and maintenance costs and (2) new capacity increments at lower capital costs and in amounts which more reasonably correspond with increased demand.

The problems related to capital investment are particularly acute in the pulp and paper industry. In the period 1965 to 1975 the cost of a new mill of equivalent size in the pulp and paper industry about tripled and economic size almost doubled, with most of the change occurring after 1970. The only completely new kraft pulp mill recently constructed in Canada, for example, cost about \$250 million for 750 tons per day of production (excluding logging development) and involved heavy government participation. These single large investments are not only risky from the point of view of continued corporate solvency but also are exceedingly difficult to finance.

In recent years there have been only a few new newsprint and no fine paper machines installed. The Canadian Pulp and Paper Association capacity surveys show that average annual growth rates in Canadian capacity of wood pulp, newsprint and other paper and paperboard from 1977 to 1980 are below those of the previous five and twenty year periods and also below those indicated for the United States.

The lumber industry, which has had major new additions to capacity in recent years, is more labour intensive; single manufacturing facilities are not nearly so costly as in the pulp and paper industry and have a greater range of economic size.

Estimates of the capital requirements for modernization of the pulp and paper industry can differ widely, depending on the extent of the program envisaged. An update of an earlier estimate by the Department of Industry, Trade and Commerce indicates the cost of implementing known opportunities for incremental capacity increases may be in the vicinity of about \$1.5 billion in 1976 dollars. It is important to note that this does not include replacement of mills. In addition, the estimated capital cost for the pulp and paper industry to meet federal air and water pollution abatement guidelines was about \$1.25 billion in 1976 dollars. In practice, modernization and pollution abatement are often inseparable, and the actual method employed may alter the cost distribution between the two. The total cost of approximately \$2.5 to \$3 billion in 1976 dollars should be regarded, however as a minimum.

In addition, the pulp and paper industry, which is the largest single consumer of purchased energy in Canadian manufacturing, has pledged to reduce its outside purchases of energy substantially into the 1980s. This will require major capital expenditures.

The modernization expenditures outlined above should add about 10 to 15 percent to current capacity, mainly in the newsprint industry, at about half the cost of new facilities. Expenditures on pollution abatement and energy conservation generally do not show as high a return and will have to compete with other capital projects for funds.

Although these estimated expenditures relate to the pulp and paper industry, any capacity expansion in the wood industries, particularly sawmills, will have to be approximately in line with those of the pulp sector if maximum benefits of integration are to be realized.

Industry Perspective on Investment

The industry justifies its investments on the basis of satisfactory returns in the context of associated risk. Ideally, the firms within the industry will allocate their available capital to projects offering the highest return. Firms can justify investment when projects are essential to continued operations or are expected to yield a satisfactory return when compared to the cost of capital, both in terms of the interest rate and the opportunity for investment in other countries or other industries. Some expenditures are required by government regulations.

On the other hand, large-scale industry expansions in other countries, particularly the developing ones, are often supported financially to a considerable extent by international organizations or local governments. The need for a satisfactory return from these investments tends to become less important in comparison with domestic objectives. The Canadian mills, including of course new mill investment which requires a satisfactory return, must compete with these foreign operations in international markets.

In reviewing the forest industry trends and particularly declining capital investment in real terms, some in the industry feel that the substantial investments made following an acceptable industry performance in the early 1960s continued into the early 1970s because it was generally felt at the time that the poor results being experienced would only be temporary and earnings would improve as the traditional industry profit cycle turned up. Some felt obliged to invest in order to preserve timber tenure or acquire new ones. Another justification for the continued investment in new facilities was the avoidance of future construction cost increases by proceeding with new projects despite changing conditions. These arguments were used to justify what some in the industry consider a period of forced growth. The industry now appears to feel that future growth must be more stable and provide a greater return on risk capital.

Firms have stated that they are often unable to justify, let alone finance, new pulp and paper mills and even replacement facilities with inflated capital costs and low anticipated returns and that they will avoid investment in certain forest industry sectors.

Because of the number of multinational firms, the industry's dependence on economically available forest resources, and the need to be competitive in world markets, capital in this industry is readily allocated to facilities in the geographical areas providing the highest return. Canadian and foreign firms with investments in Canada have acquired, or have indicated their intention to acquire, new capacity particularly in upgraded products outside of the country. During the recent downturn there were statements of lack of confidence because of a weakening competitive position and because of uncertainty arising from changing government policies as well as the lack of a vigorous economic climate.

The trend to invest outside of Canada, particularly to improve the industry's foreign market position, may strengthen and diversify certain Canadian firms. It is recognized, however, that major movements of investment capital out of Canada would have unfavourable implications at this time with respect to employment, balance of payments, regional development, resource utilization and the tax base. These considerations reinforce the importance of maintaining a stable and growth-oriented climate for investment in Canada.

Sources of Capital

Debt Financing -- Debt financing has declined, particularly in real terms, from the 1960s when it accounted for a major portion of total Canadian industrial borrowings. This is partially attributable to the overall reduction in external financing by the forest industry and to the tendency of companies to utilize short-term rather than long-term debt. The balance of long-term debt (excluding the current portion) in 1976 in the forest industry stood at \$2.9 billion. The 1976 balance for short-term debt was \$1.1 billion.

In this industry where construction requires several years and inflation can rapidly escalate costs, new capital projects often require funding over and above the original projected amounts. To cover this cost escalation, long-term debt financing is often delayed until final costs are known and short-term debt from chartered banks is used to provide funds as required. The rollover of this short-term financing into long-term debt can be more difficult and costly.

Another reason for the decrease in long-term borrowings is that many firms found themselves near the maximum long-term debt to capitalization ratios which enabled them to qualify for a premium rating by lending institutions. Canadian forest industry ratios are significantly above the average for the U.S. forest industry and well above the average for the Canadian manufacturing industry. As a result, the ability of some Canadian forest industry companies to raise funds at reasonable rates through long-term borrowings has been severely hampered.

Equity Issues -- The issuance of new equity in forest products companies, as in non-financial corporations in general, has declined as a proportion of total capital invested. Few new issues of common stock by Canadian forest products companies have occurred since 1964. Equity issues have not been well received, and in the past the industry has attributed the lack of investor confidence in the Canadian forest products industry to below average and unstable earnings performance, uncertain prospects for share value improvement, and the apparent increases in federal and provincial tax burdens.

Various types of preferred share issues have been promoted by the financial institutions to provide equity with less dilution to earnings per share than would occur if additional common stock were issued. This alternative is of course available to forest products companies but is usually an expensive source of funds.

Internal Sources -- The internal sources of funds to the forest industry from 1972 to 1976 are presented in Table 68.

TABLE 68

Internal Sources of Funds

(\$ million)

| | <u>1972</u> | <u>1973</u> | <u>1974</u> | <u>1975</u> | <u>1976</u> |
|---|-------------|-------------|-------------|-------------|-------------|
| <u>Net income (after tax and interest)</u> | | | | | |
| Pulp, paper, forestry | 56 | 249 | 689 | 337 | 286 |
| Wood industries | <u>93</u> | <u>231</u> | <u>137</u> | <u>88</u> | <u>169</u> |
| | <u>149</u> | <u>480</u> | <u>836</u> | <u>425</u> | <u>455</u> |
| <u>Depreciation and other non-cash expenses</u> | | | | | |
| Pulp, paper, forestry | 288 | 301 | 327 | 346 | 372 |
| Wood industries | <u>100</u> | <u>119</u> | <u>120</u> | <u>141</u> | <u>172</u> |
| | <u>388</u> | <u>420</u> | <u>447</u> | <u>487</u> | <u>544</u> |
| <u>Deferred taxes</u> | | | | | |
| Pulp, paper, forestry | 16 | 75 | 154 | 97 | 95 |
| Wood industries | <u>13</u> | <u>24</u> | <u>17</u> | <u>12</u> | <u>9</u> |
| | <u>29</u> | <u>99</u> | <u>171</u> | <u>109</u> | <u>104</u> |
| <u>TOTAL</u> | <u>566</u> | <u>999</u> | <u>1444</u> | <u>1021</u> | <u>1103</u> |

Source: Statistics Canada

While forest industry companies earned about \$2.5 billion in net income from 1972 to 1976, about \$1.0 billion was paid out in dividends with about \$1.5 billion retained internally.

Depreciation and other non-cash expenses accounted for about \$2.3 billion of the cash flow from operations over the five-year period. Given the rapid increases in the prices of fixed assets, however, depreciation and similar expenses do not appear to provide for replacement of the assets to which they pertain.

Deferred taxes, accounting for about \$0.5 billion during the period, increased significantly as a result of the modifications to the Income Tax Act, principally the amendment providing for a two-year write-off of capital cost allowances for manufacturing and processing equipment. While perhaps not as significant as intended because of the inflationary costs of fixed assets, these deferred taxes are still considered by companies as a very important source of funds especially when planning cash flow requirements for expansion projects.

In summary, both equity and debt have been difficult to issue. New long-term debt has been limited by high interest rates and large proportions of debt in corporate capital structures. New outside equity has been limited by inability to pay consistent dividends and unstable profit levels. In addition, the industry has relied heavily on short-term financing for fixed and other long-term assets. Industry spokesmen have pointed out that heavy reliance will have to be placed on retained earnings, capital cost allowances, and measures that might enhance their ability to raise capital.

While a low Canadian exchange rate has provided relief from competitive pressures and has increased profits and cash flows considerably, thus enhancing the internal source of funds as well as facilitating external sourcing, rising costs and future fluctuations in exchange rates could erode these advantages.

FISCAL CONSIDERATIONS

Taxation

Taxes represent a significant corporate cost and are an important influence on the industries' competitive position in world markets. The taxation policies of governments at all levels -- federal, provincial and municipal -- are vital components of the corporate investment decision and therefore principal instruments for use by governments in stimulating investment, leading to expansion, modernization and job creation.

Because the forest industry depends to such a considerable extent on exports and must therefore be competitive in these markets, the overall tax burden vis-à-vis that on the forest industries of major competing regions in the world becomes very significant. The stability and consistency of tax policy are also particularly important to the capital intensive forest industry where production from large-scale manufacturing plants can follow the investment decision by as long as three years.

For these reasons, the federal government commissioned Price Waterhouse, in 1973, to undertake a very detailed study of taxation practices related to the pulp and paper industry. The overall conclusion of the study is:

"Our review of the structures of the tax system of Canada, the United States, Sweden and Finland, combined with our quantitative analysis of the impact of the total tax burden of these four countries on the pulp and paper industry, leads us to the conclusion that the overall Canadian tax system imposes a significantly higher burden on the Canadian pulp and paper industry than do the tax systems of the other jurisdictions on their respective industries. This conclusion must be read with some qualification both because of the limitations inherent in our analysis and because of the fact that it applies only to direct tax burdens levied on the industry: account must also be taken of the total fiscal, regulatory and assistance environments in which the different industries operate.

"The relatively adverse impact of the Canadian tax system on the Canadian pulp and paper industry appears in large part to arise because of the relatively heavy burden of sales taxes, municipal real estate taxes and capital taxes imposed upon the Canadian industry. These taxes impose an

inflexible increase in the cost structure of the Canadian industry. Such taxes are particularly disadvantageous in years of low profits and in years of major capital expansion; however, they appear to retard the growth and prosperity of the Canadian industry under all circumstances.

"The Canadian income tax system in itself, with the manufacturing and processing incentives announced in May 1972 as a permanent feature, would appear to result in an income tax burden on the industry which is not dissimilar to the income tax systems of the other three jurisdictions. If the two manufacturing incentives do not become permanent features of the Canadian income tax system, the income tax structure in Canada will result in some net disadvantage by itself to the Canadian industry."

The study concluded that three factors had a particularly favourable influence on reported profits of U.S. companies. These were the immediate tax advantages available to the United States industry under the capital gains treatment of a portion of timber income; the effect of the investment tax credit; and the Domestic International Sales Corporation (DISC) rules.

There have been certain changes in the tax treatment of the industry, since the publication of this study. At the federal level, the reduced corporate tax rate of 40 percent on manufacturing income, originally introduced as a temporary measure in January 1973, has been extended indefinitely. This tax rate, of course, is applicable to the forest products industry (excluding logging) as a manufacturing industry and compares to a general tax rate of 46 percent. The two year write-off of capital cost allowances applicable to manufacturing and processing equipment (does not apply to logging) also introduced on a temporary basis, was extended without termination date in the Budget of November, 1974. The two year write-off for pollution abatement expenditures was extended indefinitely in the Budget of November 1978.

This Budget also enriched and extended indefinitely the investment tax credit for the purchase of qualified assets. The basic rate of credit was increased to seven per cent, to 10 per cent in most DREE designated areas, and to 20 per cent in the Atlantic Provinces and the Gaspé region of Quebec. The list of qualified assets for investment tax credit purposes continues to exclude certain types of logging equipment although road building equipment, forwarding equipment and trucks used in logging have been eligible since 1977.

Changing provincial and municipal taxes are difficult to monitor but nonetheless represent a significant part of the industry's overall tax burden. These include sales taxes, property taxes, capital and place of business taxes.

In addition to taxes, there are provincial stumpage and royalty charges for the right to harvest standing timber. Other charges such as ground rents and forest protection fees vary widely between provinces. The total of direct provincial revenues from the forest has exceeded \$200 million annually. In all provinces public spending on the forest exceeds these revenues considerably, although any meaningful comparison must include total costs and revenues. The provincial charges are deductible for corporate income tax purposes.

Because of the need to compete in world export markets, the forest industry supports the tax changes made in recent years to bring the overall tax burden in Canada more in line with that in the U.S. They attach special importance to the reduced corporate income tax rate, the accelerated capital cost allowances and the investment tax credit. They point out, however, the more favourable capital gains treatment of timber income for tax purposes in the United States. The industry would also prefer that logging be accorded the same tax treatment as manufacturing on the basis that logging is an integrated and highly mechanized component of forest products production and because of the importance of delivered wood costs to the overall competitive position of forest industry operations.

There have also been discussions on the use of the federal income tax system to encourage modernization throughout the industry and as an incentive for more intensive forest management, particularly reforestation. These two main issues, modernization and forest management, are probably the key concerns affecting the future of the forest products industry. Another important area of expenditure, which often does not provide an immediate payoff but relates to longer-term industry development and competitiveness, is research and development. Two modifications to taxation arising from recent budgets will encourage increased industrial R & D spending: (1) the special deduction from income applicable to incremental expenditures, and (2) the enrichment and indefinite extension of investment tax credits for both current and capital R & D expenditures.

Industry spokesmen have joined other members of the business community in recommending that inflation accounting, such as the last-in-first-out valuation of inventories and the use of replacement costs vis-à-vis historic costs in fixed asset valuation, be permitted in the calculation of income tax. In partial response to the problem of inventory value inflation, the federal government's spring 1977 budget provided for the deduction of 3 percent of opening inventory values from annual business income.

The recommendation to use LIFO inventory valuation and indexing of capital cost allowances is put forth by industry as a means of correcting distortions arising from inflation in the measure of business profits. Consideration of this option raises broader questions such as the overall impact on government revenues and the combined effect of all elements of taxation including, for example, the incentive provided by the two-year write-off. The Department of Finance is reviewing various alternatives in dealing with the effects of inflation in a broader context of business generally rather than specifically for the forest industry.

Another suggestion, apparently aimed at improving the equity of the tax system, is the use of a system allowing related corporation groups to consolidate or group income for taxation purposes. This method is acceptable in the United States and enables faster utilization of losses if more than one corporation is involved.

Exchange Rate

Variation in the rate of exchange in the Canadian dollar, particularly vis-à-vis the U.S. dollar, significantly affects sales and profits of the Canadian forest industry. For example, a large portion of the currently strong earnings are attributable to the value of the Canadian dollar.

Most of Canada's primary forest products compete in foreign markets against world competition. Prices are therefore set essentially by international supply and demand factors and are beyond the control of the industry. Under these circumstances and particularly in the short term, revenues and profit margins earned on foreign sales shift in direct proportion to the rate of change of the exchange rate. For each billion dollars of exports, a 1 percent change in the relative value of the Canadian dollar varies revenues and before-tax profits by \$10 million.

Over the longer term and even in cases of imperfect market conditions, there are undoubtedly some shifts in prices, production levels and balance between domestic and export markets following changes in the exchange rate. For the most part, however, exchange rate increases would seem to be absorbed by industry profits. The risk of short-term fluctuations can be reduced somewhat by engaging in forward market operations.

The cyclical aspects of the exchange rate are amplified within the economy by the extent to which the business cycle of Canada and that of her major trading partners coincide. If these cycles are in phase there are offsetting effects on the export and import side of the trade balance, and exchange rate variations are less severe.

Since forest industry exports exceed \$6 billion, mostly to the U.S., and the rate of exchange vis-à-vis the United States dollar has fluctuated widely over recent years, the effect on the variation in industry profits has been severe. The Canadian dollar was at a premium of up to 4 percent with the U.S. dollar for most of 1976. Since the end of 1976, the situation has been reversed with the U.S. dollar and other currencies substantially stronger. Planning and budgeting within the industry can be adversely affected by the uncertainty created by unexpected cyclical swings. In addition, any short-term benefits that accrue to Canadian firms as a result of exporting under favourable exchange rates can often mask basic structural weaknesses that will eventually require attention.

WOOD, MANUFACTURING AND DISTRIBUTION COSTS

The competitive position of Canada's forest industry is ultimately determined by the cost performance of Canadian producers relative to other major competitors. This is particularly significant vis-à-vis U.S. manufacturers where because of proximity they have a built-in transportation cost advantage over Canadian suppliers and easier access in the dominant U.S. market. Moreover, the U.S. has become a formidable competitor in offshore markets which was particularly evident during the downturn in U.S. demand in 1974-1976 and indeed in the Canadian market for some products.

Differences in harvesting and manufacturing costs between selected regions in Canada and the United States have been identified for the major commodity sectors. This information was derived from recent studies prepared by Peat, Marwick and Partners and Sandwell Management Consultants Limited for the Department of Industry, Trade and Commerce as well as other published material, trade publications and communication with provincial officials and industry personnel.

Wood Costs

Wood represents the largest single cost component in the manufacture of lumber, pulp, newsprint and other primary products and therefore is a principal factor determining a manufacturer's competitive position in world markets. The fact that there appears to be less regional variation in the aggregate of all other manufacturing costs for plants of similar scale and vintage further illustrates the importance of competitive wood costs.

The cost of harvesting and transporting wood from the stump to the manufacturing centre varies widely both within and between the major producing regions in North America and throughout the world. These variations reflect basic differences in natural factors such as climate, topography, species, stem diameters, stand densities and transportation distances as well as economic and institutional factors such as technology, logging efficiency, accessibility and related infrastructure costs, prices of labour and other factor inputs, opportunity costs and pricing policies of resource owners and the whole range of government policies and regulations.

Total delivered wood costs for softwood timber and a breakdown of the various component costs in selected regions of Canada and the United States for the year 1976 are presented in Table 69. For this table the Canadian and U.S. dollars are assumed to be at par and the comparisons therefore do not reflect the subsequent depreciation of the Canadian dollar.

TABLE 69
Harvesting Costs by Region in Canada and the United States, 1976
(\$ per unit)*

| | B.C. INTERIOR PRINCE GEORGE | B.C. COAST VAN. ISLAND | NORTHERN ONTARIO | LAC ST. JEAN QUEBEC | BATHURST NEW BRUNSWICK | NORTHWEST U.S. | NORTHEAST U.S. | SOUTHEAST U.S. |
|--|--------------------------------|---------------------------|---------------------|------------------------|---------------------------|-------------------|-------------------|-------------------|
| | Range Ave. | Range Ave. | Range Ave. | Range Ave. | Range Ave. | Range Ave. | Range Ave. | Range Ave. |
| Total wood costs including overhead delivered at mill | 34-45 1-3 | 75-85 4-6 | 60-90 5-6 | 50-75 3-5 | 50-60 1-4 | 45-140 1-85 | 50-65 1-15 | 45-60 10-15 |
| Stumpage and royalties** | 1 | 5 | 5 | 4 | 3 | 5 | 6 | 12 |
| Total costs before stumpage and royalties | 34-44 38 | 70-80 72 | 55-85 75 | 46-66 65 | 49-53 50 | 40-55 54 | 40-55 53 | 35-45 40 |
| COST COMPONENTS | | | | | | | | |
| 1. Extraction costs | 23-28 | 40-50 | 40-50 | 35-45 | 38-45 | 25-35 | 30-40 | 20-25 |
| - camp costs | 1-2 | 10-15 | 1-10 | 3-10 | 1-6 | - | 3-5 | - |
| - falling and bucking | 5-7 | 4-5 | 12-17 | 12-16 | 12-14 | 5-9 | 10-17 | 4-6 |
| - delivery cost (excluding road costs): | - | - | - | - | - | - | - | - |
| - stump to roadside | 6-9 | 9-12 | 6-9 | 6-10 | 5-8 | 8-10 | 5-8 | 6-8 |
| - roadside to mill | 11-13 | 18-25 | 11-16 | 10-13 | 13-16 | 12-18 | 10-18 | 6-12 |
| 2. Road costs | | | | | | | | |
| - primary and secondary road construction | 0-3 | 8-10 | 3-8 | 2-3 | 2-3 | 1-3 | 2-3 | 0-1 |
| - primary and secondary road maintenance | 0-1 | 1-3 | | 2-6 | 1-2 | 1-3 | 1-3 | 0-3 |
| 3. Equipment costs (depreciation and leasing) | T/E*** | 3-7 | T/E | T/E | 1-5 | T/E | T/E | T/E |
| 4. Administration costs | 3-10 | 5-10 | 5-10 | 3-10 | 4-8 | 3-8 | 4-8 | 5-10 |
| 5. Silviculture (including spraying) | 1-3 | T/E | T/E | T/E | 1-3 | 1-3 | T/E | 2-4 |

Source: Peat, Marwick and Partners, 1977, "Analysis of Wood Costs in the North American Forest Products Industries", Department of Industry, Trade and Commerce

* Canadian and U.S. dollars considered at par.

** The average stumpage rates are those reported by the participants and industry associations and are not necessarily the average cost for the region

*** T/E indicates that component cost is included in total costs and extraction costs.

The cost of wood delivered to the mill in the U.S. South and the B.C. Interior is considerably below other producing regions. In contrast, delivered wood costs in Ontario and Quebec are among the highest in North America. It should be recognized, however, that a significant part of the wood cost differential between producers in Ontario and Quebec and mills located in lower cost regions such as the B.C. Interior and the U.S. South can be attributed to natural factors and are beyond the control of individual producers. For example, the slower growth rates, smaller stem diameters and lower volumes of merchantable timber per acre in Central Canada compared with the U.S. South require a much larger area for logging the same volume of wood resulting in longer haul distances and additional expenditures for the construction of more extensive road networks, camp facilities and related infrastructure. Smaller tree size and more rugged terrain in Ontario and Quebec also mean a loss of productivity in logging operations and higher wood costs. Moreover, greater accessibility and significantly lower rotation ages of growing stock in the U.S. South have a major impact on the financial gains realized through more intensive forest management practices.

Delivered wood costs in the coastal regions of British Columbia and to a lesser extent in the U.S. Northwest are also high by North American standards. However, favourable climate, site conditions and species mix result in fast growth rates and large diameter trees in these regions, greatly increasing the end-product value of logging operations. In addition, the greater use of wood residues and low grade material for pulping operations is a major factor in keeping wood costs competitive with other regions.

Average 1976 wood costs in New Brunswick and the Northeastern U.S. were about in the middle of the range in North America at about \$50 to \$65 per cunit. In addition to the regions indicated in the table, delivered wood costs in Alberta were about the same as in the B.C. Interior or \$35 to \$45 per cunit and in Newfoundland about the same as in Central Canada at about \$70 to \$80 per cunit.

Variations in wood density as they affect the cost of wood per ton of product is an important element to take into consideration when comparing wood costs in pulp and paper operations. For example, because of differences in wood density, a ton of bleached kraft pulp requires approximately 1.7 to 1.9 cunits of Eastern Canadian softwood compared to approximately 1.4 to 1.5 cunits of southern pine. Moreover, the long-fibred nature of southern pine permits the addition of lower cost and denser hardwoods of up to 15 percent wood input for many grades without a serious loss of pulp quality. The density of B.C. wood varies with species but on average, appears to be slightly higher than Eastern Canadian wood but still significantly lower than southern pine.

In terms of economic factors, the comparatively high wage rates and other labour compensation needed to attract and maintain an adequate labour force in the northern and more remote regions of Canada contribute to a significant cost disadvantage for logging operations in these regions.

While it is difficult to make valid comparisons of stumpage rates between regions because of the different systems used and the importance of other contractual obligations, some general conclusions can be drawn. Stumpage rates for wood represent only about 5 to 10 percent of total wood costs in Canada which would suggest that there is little room for appreciably lowering wood costs by reducing stumpage rates. In contrast, stumpage rates for both public and private timber are significantly higher in the U.S. South and the U.S. Pacific Northwest which offsets to some extent the logging cost advantage existing in these regions. While stumpage rates will likely continue to increase in the United States as the supply/demand balance tightens, total wood costs are still expected to remain higher in Canada for some time in the future.

In order to put North American wood costs in an international perspective, Table 70 outlines the prices of pulpwood delivered to the mill in the major producing region of Europe, Scandinavia, and in a major developing country, Brazil.

TABLE 70

Prices of Pulpwood Delivered at the Mill
in Scandinavia and Brazil, 1977

(Can. \$/cunit)*

| | <u>Sweden**</u> | <u>Finland</u> | <u>Brazil</u> |
|---------------|-----------------|----------------|---------------|
| Pine | 100-125 | 100-105 | 40-45 |
| Spruce | 105-135 | 105-120 | - |
| Sawmill chips | 100-125 | 100-105 | - |
| Eucalyptus | - | - | 35-43 |

Sources: Jackko Poyry, 1978 "Analysis of Manufacturing Costs in Some Scandinavian Pulp and Paper Industries", Department of Industry, Trade and Commerce.

T.P. Clephane, 1978 "Despite Some Problems, Paper is a Fast-Growing Industry in Brazil", Paper Trade Journal, January 1, 1978.

* Exchange rates as of January, 1977.

** For the 1977/78 season, most Swedish pulpwood prices dropped by 5 to 15 percent from the levels shown above.

Pulpwood prices are considerably higher in Scandinavia than in North America due to a combination of factors related to the structure of forest ownership, the balance of supply and demand for wood and government policy. About one-half of the cost of pulpwood indicated in the table is for stumpage. Private forests account for a significant part of the wood supply of the domestic industry and negotiations between companies and private owner groups usually set the final price of stumpage. Moreover, these comparatively high stumpage rates also reflect greater expenditure in forest management. Because the high degree of mechanization achieved through large scale logging operations is limited to the large private ownerships, the fragmented nature of ownership among numerous small woodlot owners, particularly in Finland, results in low productivity on many sites.

While growth rates of timber are remarkably high in Brazil, and an increasing proportion of fibre is sourced from plantation stock, it would appear that the delivered price of wood in Brazil is about the same as in the U.S. South but still considerably below that prevailing in most regions of Canada. The price ranges indicated in the table are open market transfer prices, about 40 percent of which is stumpage. When differences in wood densities are taken into account, the delivered cost per ton of pulp is about 10 percent higher in Brazil than in the U.S. South for unbleached pine and about 10 percent lower for bleached eucalyptus compared with U.S. hardwoods*.

The dramatic increase in delivered wood costs in Canada is only a recent phenomena as wood costs remained relatively stable for many years prior to 1972 as indicated in Table 71.

* T.P. Clephane, Paper Trade Journal, January, 1978.

TABLE 71

Average Cost of Pulpwood Used by Pulp and Paper Mills
in Canada, 1961 - 1976

| | (\$ per cunit) | | | | |
|-------------------|----------------|-----------------------------|----------------|---------------|----------------------------|
| | <u>Canada</u> | <u>British Columbia</u> | <u>Ontario</u> | <u>Quebec</u> | <u>Other Provinces</u> |
| <u>Roundwood</u> | | | | | |
| 1961 | 29.77 | 20.08 | 33.62 | 31.86 | 27.95 |
| 1965 | 29.64 | 21.12 | 33.05 | 32.16 | 27.90 |
| 1970 | 34.11 | 25.15 | 38.61 | 37.65 | 30.89 |
| 1971 | 37.70 | 26.22 | 40.16 | 38.11 | 30.97 |
| 1972 | 35.66 | 28.80 | 40.17 | 39.23 | 31.64 |
| 1973 | 39.33 | 32.90 | 42.23 | 43.14 | 37.58 |
| 1974 | 46.64 | 38.73 | 49.44 | 51.72 | 43.34 |
| 1975 | 56.82 | 52.24 | 63.26 | 61.36 | 49.99 |
| 1976 | 61.53 | 51.11 | 67.91 | 67.78 | 55.66 |
| <u>Pulp Chips</u> | | | | | |
| 1961 | 20.25 | 17.66 | 29.32 | 26.47 | 28.74 |
| 1965 | 25.32 | 24.34 | 31.08 | 30.02 | 28.52 |
| 1970 | 24.79 | 21.92 | 35.27 | 35.38 | 27.90 |
| 1971 | 25.63 | 21.12 | 37.87 | 36.54 | 33.79 |
| 1972 | 26.40 | 22.30 | 35.98 | 36.35 | 33.87 |
| 1973 | 26.69 | 22.35 | 35.30 | 37.58 | 36.26 |
| 1974 | 36.11 | 33.94 | 39.73 | 47.85 | 39.29 |
| 1975 | 48.41 | 49.52 | 57.21 | 55.75 | 46.15 |
| 1976 | 46.77 | 45.04 | 60.38 | 53.33 | 53.09 |

Source: Statistics Canada

The cost of pulpwood remained virtually unchanged in Canada throughout the 1950s and first half of the 1960s. Between 1965 and 1972, the average cost of pulpwood for Canada as a whole rose from \$29.64 to \$35.66 per cunit, an increase of 2.6 percent per year compared with an annual increase of 9.6 percent in the average logging wage rate. The industry was able to control wood costs despite major escalations in labour costs during this period through increased mechanization of woodland operations and more efficient logging methods. The development and widespread use of improved chain saws, wheeled skidders and mechanized slashers are responsible for a significant part of these efficiency gains.

In contrast, delivered wood costs have almost doubled since 1972. The average cost of pulpwood increased from \$35.66 in 1972 to \$61.53 in 1976, an average annual increase of 14.6 percent. While the industry has made major investments in the development and application of more fully mechanized logging operations over the last few years, the increased productivity achieved by these new systems has not been sufficient to offset rising wage rates and the depreciation, repair and maintenance expenses associated with the new equipment. Despite increased mechanization, current logging methods are still relatively labour intensive as direct labour costs account for from 40 to 60 percent of total wood costs. Further, it is often suggested that these more fully mechanized systems have not resulted in any cost savings over the more labour-intensive methods but have been necessary to counter labour shortages being experienced in many woodland operations. It is clear, however, that in view of the continued advancement into the more marginal and remote timber stands, attention should continue to be focused on the development of further mechanized systems and improved logging methods in order to reduce the upward pressure on wood costs in Canada.

Manufacturing and Distribution Costs

The following section provides a comparison of manufacturing and distribution costs for softwood lumber, softwood plywood, pulp and newsprint.

Softwood Lumber

The direct cost of producing softwood lumber varies widely in the different forest regions in Canada because of the great diversity in sawing methods, plant scale and vintage. Moreover, the price of logs available to the sawmill operator is a major component of total production costs and varies from one region to the other. Revenue from the sale of pulp chips and other wood residues is often used to offset wood costs in the accounting practices used by many firms, further complicating direct comparisons between producers.

An analysis of manufacturing costs of the forest industry in North America by Sandwell Management Consultants Limited for the Department of Industry, Trade and Commerce, indicates that the direct costs of processing lumber exclusive of transportation charges, in a typical dimension mill in North America range from \$120 per thousand board feet to \$170 per thousand board feet. The results of this survey are indicated in Table 72.

TABLE 72

**Manufacturing and Distribution Costs of Softwood Lumber
in Selected Regions of North America, 1976***

| (\$ per thousand board feet) | | | | | | |
|------------------------------|---|--|-----------------------------|-------------------------------------|-----------------------------------|-----------------------------------|
| | <u>British Columbia Coast</u> | <u>British Columbia Interior</u> | <u>Northern Ontario</u> | <u>North Eastern Quebec</u> | <u>South Eastern U.S.</u> | <u>North Western U.S.</u> |
| <u>Main Products</u> | <u>Boards Dimension Timbers</u> | <u>Dimension</u> | <u>Studs</u> | <u>Dimension Studs</u> | <u>Dimension Studs</u> | <u>Dimension</u> |
| <u>Wood (Net)</u> | | | | | | |
| - Low | 89 | 45 | 73 | 28 | 53 | 94 |
| - High | 92 | 55 | 94 | 119 | 85 | 119 |
| <u>Other Materials</u> | | | | | | |
| - Low | 10 | 7 | 9 | 11 | 7 | 13 |
| - High | 13 | 16 | 11 | 29 | 16 | 15 |
| <u>Energy</u> | | | | | | |
| - Low | 0 | 3 | 4 | 2 | 2 | 2 |
| - High | 3 | 10 | 6 | 6 | 10 | 4 |
| <u>Labour</u> | | | | | | |
| - Low | 58 | 31 | 29 | 17 | 14 | 22 |
| - High | 61 | 45 | 40 | 54 | 32 | 33 |
| <u>Administration</u> | | | | | | |
| - Low | 15 | 8 | 8 | 9 | 5 | 2 |
| - High | 22 | 19 | 9 | 21 | 12 | 7 |
| <u>Depreciation</u> | | | | | | |
| - Low | 2 | 4 | 9 | 4 | 3 | 3 |
| - High | 3 | 11 | 11 | 17 | 11 | 8 |
| <u>Transportation</u> | | | | | | |
| - Low | 40 | 45 | 25 | 4 | 15 | 50 |
| - High | 45 | 54 | 30 | 27 | 20 | 55 |
| TOTAL | | | | | | |
| - Low | 223 | 156 | 176 | 145 | 111 | 194 |
| - High | 231 | 183 | 183 | 249 | 169 | 235 |
| - Weighted average** | 229 | 176 | 180 | 166 | 141 | 210 |

Source: Sandwell Management Consultants Limited, 1977, "Analysis of Manufacturing Costs in the North American Forest Products Industries", Department of Industry, Trade and Commerce.

* Canadian and U.S. currencies were assumed equivalent in value.

** Average total cost weighted to production.

Production costs are lower in the B.C. Interior and the U.S. South than in Central Canada. Production costs for sawmills on the B.C. Coast and in the Pacific Northwest U.S. are in the upper part of the range but direct comparison of cost data for these mills is difficult since they produce a much broader range of lumber products, including higher valued specialty items, than is found in the other producing regions. The major conclusion is that most Canadian producers of standard softwood lumber items are generally competitive with their counterparts in the U.S.

Softwood Plywood

The following section compares the average cost of production of softwood plywood in British Columbia and in the U.S. Douglas Fir Region. The U.S. Douglas Fir Region, as referred to here, includes Western Washington, Western Oregon and Northern California and is the largest single producing region in the United States, accounting for about 60 percent of total U.S. softwood plywood production. Plywood mills on the B.C. Coast and in the U.S. Douglas Fir Region generally produce a full range of plywood products with the current product mix in both regions being almost equally divided between sanded and sheathing grades. Plywood mills in the B.C. Interior, on the other hand, are limited to the production of sheathing grades only. For comparative purposes, average production costs in the B.C. Interior were compared with the average costs of producing similar sheathing grades in the U.S. Douglas Fir Region. Comparisons between the B.C. Coast and U.S. Douglas Fir Region reflect the existing product mix in each region. Table 73 shows the trend in profitability and average production costs in the industry from 1972 to 1975 as a percentage of 1972 figures set at 100. Table 74 indicates the major components of cost and Table 75 compares selling prices and costs by setting each item listed under the U.S. Douglas Fir Region equal to 100.

TABLE 73

**Profitability and Production Cost Trends of Softwood Plywood
in Canada and the United States, 1972-75**

| | (Percent) | | | |
|--------------------------------|-------------|-------------|-------------|-------------|
| | <u>1972</u> | <u>1973</u> | <u>1974</u> | <u>1975</u> |
| <u>B.C. Coast</u> | (base year) | | | |
| Total costs | 100 | 122 | 145 | 152 |
| Net selling price | 100 | 118 | 129 | 128 |
| Net profit before tax | 100 | 7 | loss | loss |
| <u>B.C. Interior</u> | | | | |
| Total costs | 100 | 103 | 129 | 118 |
| Net selling price | 100 | 116 | 118 | 124 |
| Net profit before tax | 100 | 171 | 74 | 148 |
| <u>U.S. Douglas Fir Region</u> | | | | |
| Total costs | 100 | 119 | 138 | 149 |
| Net selling price | 100 | 116 | 118 | 124 |
| Net profit before tax | 100 | 138 | loss | loss |

Source: Price Waterhouse

TABLE 74

**Distribution of Revenue and Production Costs
of Softwood Plywood, 1975**

| | (Percent) | | | |
|---------------------------------|--|-----------------------|--|--------------------------|
| | <u>U.S. Douglas Fir Region</u> | <u>B.C. Coast</u> | <u>U.S. Douglas Fir Region Sheathing</u> | <u>B.C. Interior</u> |
| Manufacturing Costs | | | | |
| Labour | 24.0 | 28.0 | 21.9 | 28.8 |
| Wood | 44.5 | 39.0 | 46.6 | 24.5 |
| Resin | 5.7 | 5.2 | 6.0 | 9.4 |
| Energy | 3.0 | 3.1 | 3.4 | 3.4 |
| Sub-Total | <u>77.2</u> | <u>75.3</u> | <u>77.9</u> | <u>66.1</u> |
| Interest and depreciation | 6.8 | 6.7 | 7.3 | 8.1 |
| Overhead and administration | <u>16.0</u> | <u>18.0</u> | <u>14.8</u> | <u>25.8</u> |
| Total costs | 100.0 | 100.0 | 100.0 | 100.0 |
| Net selling price (f.o.b. mill) | 93.4 | 93.6 | 95.2 | 129.7 |
| Net profit before tax | (6.6) | (6.4) | (4.8) | 29.7 |

Source: Price Waterhouse

TABLE 75

**Comparison of Net Selling Price and Average Production Costs
of Softwood Plywood, 1975**

| | (percent) | | | |
|-----------------------------|--|---------------|--|------------------|
| | U.S. Douglas Fir Region (base region) | B.C. Coast | U.S. Douglas Fir Region Sheathing | B.C. Interior |
| Manufacturing Costs | | | | |
| Labour | 100 | 148 | 100 | 120 |
| Wood | 100 | 112 | 100 | 48 |
| Resin | 100 | 118 | 100 | 142 |
| Energy | 100 | 133 | 100 | 91 |
| Interest and depreciation | 100 | 126 | 100 | 100 |
| Overhead and administration | 100 | 143 | 100 | 159 |
| Total costs | 100 | 128 | 100 | 91 |
| Net selling price | 100 | 128 | 100 | 124 |

Source: Price Waterhouse

Observations -- Average production costs are considerably greater on the B.C. Coast than in the U.S. Douglas Fir Region. Plywood mills in the B.C. Interior, on the other hand, enjoy substantially lower wood costs and are fully competitive with sheathing mills in the U.S. Douglas Fir Region. Plywood mills in the B.C. Interior are more profitable than plywood mills in the other regions, reflecting the higher level of plywood prices in Canada. In fact, costs have increased at a faster rate than product prices between 1972 and 1975 and plywood mills in both the B.C. Coast and U.S. Douglas Fir Region reported losses in 1974 and 1975.

Direct labour costs represent between 22 and 29 percent of total production costs in the three regions. Labour costs are higher in British Columbia than in the U.S. Douglas Fir Region because of higher wage rates and lower productivity.

Wood costs, discussed in another section, represent between 40 and 45 percent of total production costs in the B.C. Coast and U.S. Douglas Fir Regions and only 25 percent in the B.C. Interior. Wood costs declined sharply in the B.C. Interior in 1975 as a result of significant reductions in stumpage and royalty payments. The B.C. Coast wood costs used in the preceding tables are based on the market price of logs on the Vancouver Log Market. Actual wood costs could be lower depending on the sources of supply available to individual companies. Wood costs are relatively high on the B.C. Coast because of more difficult logging conditions and the growing competition for high quality logs. Wood costs are lower in the U.S. Douglas Fir Region but this gap has been steadily closing because of increased competition and higher stumpage costs for public timber in the United States.

Resin costs more than doubled between 1972 and 1975 and represent between 5 and 10 percent of total production costs. Resin costs are significantly higher in British Columbia due to greater use of resin per unit of output and higher unit prices.

The costs of power and fuel more than doubled between 1972 and 1975 in the B.C. Coast and U.S. Douglas Fir Region and increased by almost one-third in the B.C. Interior. Energy costs represent about 3 percent of total production costs in all regions.

Overhead and administration costs are significantly higher in British Columbia than in the U.S. Douglas Fir Region because of the higher costs of maintenance and operating supplies associated with remote locations and adverse climate conditions.

Softwood Bleached Kraft Pulp and Newsprint

Existing Facilities -- To quantify and substantiate the competitive position of existing Canadian producers, a study of actual 1976 newsprint and bleached kraft market pulp manufacturing costs for selected regions in Canada and the United States was conducted by Sandwell Management Consultants Limited for the Department of Industry, Trade and Commerce.

The range of actual 1976 manufacturing and distribution costs for bleached kraft pulp and newsprint are presented in Tables 76 and 77 respectively. These two tables provided the basis for calculating the two additional tables, 78 and 79, which present the average of costs by element and region. Differences in the costs between the region having the least total cost (Southeastern U.S.) and the other regions are given in the second part of Tables 78 and 79.

It should be noted that the costs presented in all four of these tables do not necessarily represent all operations in a specific region but are reasonably representative of the general cost levels experienced in the regions. The comparisons are intended to illustrate the areas in which differences exist and an approximation in the magnitude of those differences.

Judgement has been exercised in the presentation of some of the average costs in an attempt to provide figures that are comparable and representative of the regions. For example, the data given in Table 76 for the Southeastern U.S. is based on pulp produced predominantly from southern hardwoods whereas in Table 78, average wood and chemical costs have been adjusted to be more representative of facilities producing pulp from softwoods.

It should be noted that these cost comparisons were conducted in 1976 assuming U.S. and Canadian currencies at par. There was, however, a significant drop in the Canadian dollar versus the U.S. dollar commencing in late 1976 and continuing through to the present time. If this differential in currencies is taken into account in the comparisons then the cost advantage shown by U.S. producers over Canadian producers is significantly diminished.

TABLE 76

Manufacturing and Distribution Costs for
Bleached Softwood Kraft Pulp, 1976*

(\$ per air-dried ton)

| | <u>Southeastern</u> <u>U.S.</u> | <u>Northwestern</u> <u>U.S.</u> | <u>British</u> <u>Columbia</u> <u>Interior</u> | <u>British</u> <u>Columbia</u> <u>Coast</u> | <u>Northern</u> <u>Ontario</u> |
|-------------------------------|------------------------------------|------------------------------------|--|---|-----------------------------------|
| Wood (low-high) | 65 - 83 | 65 - 73 | 69 - 83 | 82 - 100 | 106 - 148 |
| Labour | 17 - 34 | 20 - 30 | 24 - 44 | 28 - 48 | 27 - 48 |
| Energy | 16 - 18 | 25 - 29 | 9 - 22 | 17 - 19 | 18 - 41 |
| Chemicals | 29 - 30 | 24 - 28 | 22 - 29 | 17 - 28 | 36 - 45 |
| Other materials | 11 - 36 | 23 - 27 | 17 - 32 | 16 - 25 | 17 - 21 |
| Administration/ overhead** | 9 - 14 | 23 - 27 | 14 - 31 | 18 - 28 | 19 - 40 |
| Depreciation | 10 - 16 | 15 - 17 | 8 - 22 | 8 - 12 | 5 - 17 |
| Transportation | 25 - 35 | 29 - 33 | 40 - 52 | 30 - 39 | 22 - 28 |
| TOTAL | | | | | |
| Low | 205 | 231 | 219 | 240 | 292 |
| High | 245 | 256 | 271 | 260 | 361 |
| Weighted Average*** | 227 | 244 | 252 | 250 | 321 |

Source: Sandwell Management Consultants Limited, 1977, "Analysis of Manufacturing Costs in the North American Forest Product Industries", Department of Industry, Trade and Commerce.

* Canadian and U.S. currencies were considered to be equivalent in value.

** Elements in administration and overhead vary from company to company and therefore caution must be exercised in direct comparison of this cost component from region to region. Inventory interest expense and other financing costs have not been included as a cost component. This may range from \$4.00 to \$26.00 per ADT pulp.

*** Average total cost weighted to production.

TABLE 77

Manufacturing and Distribution Costs for
Newsprint, 1976*

(\$ per ton)

| | <u>Southeastern U.S.</u> | <u>Northwestern U.S.</u> | <u>British Columbia Coast</u> | <u>Eastern Canada</u> |
|-------------------------------|------------------------------|------------------------------|---------------------------------------|---------------------------|
| Wood (low-high) | 43 - 46 | 40 - 50 | 56 - 66 | 62 - 91 |
| Labour | 34 - 40 | 35 - 51 | 36 - 56 | 39 - 65 |
| Energy | 40 - 71 | 36 - 42 | 24 - 25 | 16 - 38 |
| Chemicals | 9 - 11 | 6 - 14 | 6 - 9 | 2 - 11 |
| Other materials | 23 - 25 | 23 - 25 | 22 - 26 | 14 - 26 |
| Administration/ overhead** | 17 - 20 | 10 - 19 | 20 - 29 | 15 - 36 |
| Depreciation | 12 - 17 | 15 - 25 | 8 - 13 | 5 - 12 |
| Transportation | 10 - 13 | 25 - 29 | 31 - 35 | 30 - 53 |
| TOTAL | | | | |
| Low | 200 | 220 | 224 | 221 |
| High | 232 | 225 | 244 | 276 |
| Weighted Average*** | 210 | 222 | 238 | 243 |

Source: Sandwell Management Consultants Limited, 1977, "Analysis of Manufacturing Costs in the North American Forest Product Industries", Department of Industry, Trade and Commerce.

* Canadian and U.S. currencies were considered to be equivalent in value.

** Elements in administration and overhead vary from company to company and therefore caution must be exercised in direct comparison of this cost component from region to region. Inventory interest expense and other financing costs have not been included as a cost component. This may range from \$5.00 to \$10.00 per ton of newsprint.

*** Average total cost weighted to production.

TABLE 78

Average Manufacturing and Distribution Costs
for Market Softwood Bleached Pulp, 1976*

(\$ per air dried ton)

| | Southeastern U.S. | Northwestern U.S. | British Columbia Interior | British Columbia Coast | Northern Ontario |
|--------------------------------|----------------------|----------------------|---------------------------------|------------------------------|---------------------|
| Wood | 80** | 69 | 77 | 89 | 128 |
| Labour | 27 | 25 | 31 | 37 | 38 |
| Energy | 18 | 27 | 15 | 18 | 28 |
| Chemicals | 35** | 26 | 25 | 21 | 36 |
| Other materials | 26 | 25 | 24 | 21 | 18 |
| Administration/ overhead*** | 12 | 25 | 25 | 21 | 30 |
| Depreciation | 13 | 16 | 14 | 10 | 10 |
| Transportation | 31 | 31 | 45 | 33 | 26 |
| TOTAL | 242 | 244 | 256 | 250 | 314 |

Differences

| | | | | | |
|--------------------------------|---|-----|-----|-----|-----|
| Wood | 0 | -11 | - 3 | + 9 | +48 |
| Labour | 0 | - 2 | + 4 | +10 | +11 |
| Energy | 0 | + 9 | - 3 | 0 | +10 |
| Chemicals | 0 | - 9 | -10 | -14 | + 1 |
| Other materials | 0 | - 1 | - 2 | - 5 | - 8 |
| Administration/ overhead*** | 0 | +13 | +13 | + 9 | +18 |
| Depreciation | 0 | + 3 | + 1 | - 3 | - 3 |
| Transportation | 0 | 0 | +14 | + 2 | - 5 |
| TOTAL | 0 | + 2 | +14 | + 8 | +72 |

Source: Sandwell Management Consultants Limited, 1977, "Analysis of Manufacturing Costs in the North American Forest Products Industries", Department of Industry, Trade and Commerce.

* Canadian and U.S. currencies were considered to be equivalent in value.

** Costs adjusted to reflect pulp produced predominantly from softwoods.

*** Elements in administration and overhead vary considerably from company to company; therefore, caution must be exercised in direct comparison of this cost component from region to region. Inventory interest and other financing costs are not included as item of cost. Interest expense may range from \$4.00 to \$26.00 per ton of pulp.

TABLE 79

Average Manufacturing and Distribution Costs
for Newsprint, 1976*

(\$ per ton)

| | <u>Southeastern U.S.</u> | <u>Northwestern U.S.</u> | <u>British Columbia Coast</u> | <u>Eastern Canada</u> |
|-------------------------------|------------------------------|------------------------------|---------------------------------------|---------------------------|
| Wood | 44 | 45 | 61 | 71 |
| Labour | 38 | 43 | 51 | 49 |
| Energy | 50 | 39 | 24 | 26 |
| Chemicals | 10 | 10 | 7 | 6 |
| Other materials | 25 | 24 | 25 | 19 |
| Administration/ overhead** | 19 | 14 | 25 | 27 |
| Depreciation | 13 | 20 | 11 | 8 |
| Transportation | <u>11</u> | <u>27</u> | <u>34</u> | <u>37</u> |
| TOTAL | 210 | 222 | 238 | 243 |

DIFFERENCES

| | | | | |
|-------------------------------|----------|------------|------------|------------|
| Wood | 0 | + 1 | +17 | +27 |
| Labour | 0 | + 5 | +13 | +11 |
| Energy | 0 | -11 | -26 | -24 |
| Chemicals | 0 | 0 | - 3 | - 4 |
| Other materials | 0 | - 1 | 0 | - 6 |
| Administration/ overhead** | 0 | - 5 | + 6 | + 8 |
| Depreciation | 0 | + 7 | - 2 | - 5 |
| Transportation | <u>0</u> | <u>+16</u> | <u>+23</u> | <u>+26</u> |
| TOTAL | 0 | +12 | +28 | +33 |

Source: Sandwell Management Consultants Limited, 1977, "Analysis of Manufacturing Costs in the North American Forest Products Industries", Department of Industry, Trade and Commerce.

* Canadian and U.S. currencies were considered to be equivalent in value.

** Elements in administration and overhead vary considerably from company to company; therefore, caution must be exercised in direct comparison of this cost component from region to region. Inventory interest and other financing costs are not included as item of cost. Interest expense may range from \$5.00 to \$10.00 per ton of newsprint.

It is readily apparent from the comparison of actual costs that Canadian producers in most of the regions studied have a pronounced disadvantage with respect to wood, labour and transportation costs.

Wood is substantially more expensive in most Canadian regions compared with the U.S. South because the climate is less favourable for growth and harvesting. The U.S. South also benefits from well established federal, state and county road systems, whereas Canadian mills have extensive road building and maintenance costs as well as usually longer hauls. In addition, because of its lower density a greater volume of Canadian wood is required per ton of product. Pulpwood is normally priced on a volume basis but the yield of pulp from wood is dependent on wood weight. There are exceptions to high cost Canadian wood such as in the B.C. Interior where the exclusive use of sawmill residues at arbitrarily established prices provides wood at costs comparable to those in the United States.

Wage rates in the United States South have generally been lower than in Canada and high wage settlements in Canada in the period 1970-1976 increased this difference. There are indications that with recent higher wage settlements in the U.S. and generally more moderate settlements being made in Canada, the labour cost differential is diminishing.

Higher transportation costs reflect the inherent disadvantage suffered by most Canadian producers. While a producer in the United States South can normally dispose of his production within a fairly short distance from his mill, most producers in Canada must cover a much larger territory to secure markets for their production. This results in considerably longer hauls often at disadvantageous freight rates on a cost per ton mile basis in comparison with U.S. mills.

In newsprint production, eastern Canadian mills show the greatest cost disadvantage in total and are followed closely by the B.C. coastal mills. Energy costs in Canadian newsprint production are lower due to lower hydro rates and the use of stone grinders, which are less energy intensive than the use of refiners, to produce mechanical pulp.

Differences in market pulp cost elements and totals are less pronounced between regions than those for newsprint, the exception being the case of Northern Ontario.

New Facilities -- It is evident from the previous section that existing Canadian facilities suffer a disadvantage in terms of manufacturing and distribution costs. This section addresses the question of investment in new facilities, both in Canada and the United States. Tables 80 and 81, provide a comparison of costs and profitability for hypothetical new mills in the U.S. South and in Central Canada (Ontario and Quebec). Comparisons are made for softwood bleached kraft pulp and newsprint using an index of 100 for capital costs, manufacturing and distribution costs, and profitability for the hypothetical new mill in the U.S. South.

Since the comparison is made for hypothetical new mills, it has been necessary to apply certain assumptions in order to provide data on a comparable basis.

All pulp and newsprint mills are assumed to be of 1,000 tons per day (350,000 tons per year) capacity using softwood as fibre furnish. The newsprint mills are only integrated with respect to mechanical pulping, using refiners for the production of mechanical pulp, but purchase their chemical pulp furnish.

The new mills are costed at 1976 levels for all cost elements. The capital costs per annual ton takes into consideration all normal capital cost elements including pollution control but not forest land and infrastructure. Forty percent of the total capital cost is assumed to be provided from equity with the balance as interest bearing debt. The interest rates used are 9 percent per annum in the U.S. South and 12 percent for new mills in Central Canada. Facilities for all mills are assumed to have a 20-year life and depreciation is straight line. The working capital for all mills is based on 1976 levels and mainly reflects the higher wood inventory essential in Canadian mills.

TABLE 80

**Direct Comparison of Costs and Profitability for
Softwood Bleached Kraft Pulp, 1976**

| | <u>U.S. South New Mill</u> | <u>Central Canada New Mill</u> |
|---|--------------------------------|------------------------------------|
| Capital costs per annual ton | 100 | 105 |
| Working capital | 100 | 120 |
| Manufacturing costs | | |
| Wood | 100 | 153 |
| Labour (incl. fringe) | 100 | 108 |
| Energy | 100 | 82 |
| Other | 100 | 111 |
| Overhead, selling and administration costs | 100 | 113 |
| Transportation costs | 100 | 200 |
| Interest on debt (40% equity) | 100 | 140 |
| Depreciation (5% annum straight line) | 100 | 105 |
| Total delivered cost | 100 | 126 |
| Gross before tax | 100 | < 100 |
| Equity | 100 | 105 |
| Return on equity before tax | 100 | < 100 |

Source: Industry, Trade and Commerce.

TABLE 81

**Direct Comparison of Costs and Profitability for
Newsprint, 1976**

| | <u>U.S. South New Mill</u> | <u>Central Canada New Mill</u> |
|--|--------------------------------|------------------------------------|
| Capital costs per annual ton | 100 | 105 |
| Working capital | 100 | 125 |
| Manufacturing costs | | |
| Wood | 100 | 175 |
| Purchased chemical pulp | 100 | 103 |
| Labour (incl. fringe) | 100 | 123 |
| Energy | 100 | 88 |
| Other | 100 | 125 |
| Overhead, selling and administration costs | 100 | 113 |
| Transportation costs | 100 | 230 |
| Interest on debt (40% equity) | 100 | 140 |
| Depreciation (5% annum straight line) | 100 | 104 |
| Total delivered cost | 100 | 128 |
| Gross before tax | 100 | < 100 |
| Equity | 100 | 105 |
| Return on equity before tax | 100 | < 100 |

Source: Industry, Trade and Commerce.

The comparisons of hypothetical new mills indicate that at the present time new investment for the production of bleached kraft pulp and newsprint in Canada is less profitable and hence less attractive than similar investments in the United States South. In terms of a new mill, the Canadian producer in Central Canada would be at a disadvantage with respect to capital costs and most manufacturing costs particularly in the area of wood, labour and transportation. The only exception is in the cost of energy.

Existing mills in certain instances can be profitable, if not more profitable, than new mills, whether in Canada or in the United States, largely due to lower capital related costs. These lower capital related costs can in some existing mills be sufficient to overcome wood/labour and transportation cost disadvantages to provide more attractive returns. Moreover, returns on incremental investments are generally higher than those from investments in new mills. Many of the existing Canadian mills, therefore, have the potential to attract investment for expansion and modernization despite actual cost elements which appear high in comparison with those in the U.S. South. The return on incremental investment can be favourable when compared to investment for greenfield operations.

LABOUR AND MANPOWER

The cost and availability of labour has become an increasingly important factor affecting the competitive position of the Canadian forest products industry. Many of the manpower difficulties of the industry relate to the hiring and retention of workers. Clearly, turnover has been high in some situations. Shortages of skilled workers, although alleviated to some extent by the recent downturn, has been a recurring problem in some segments of the industry, particularly in the more remote communities. Future growth may be limited unless the problems associated with seasonal and cyclical work and lack of amenities in the outlying areas are resolved. Moreover, there is considerable scope for improving the industrial relations climate in the industry as evidenced by the increased tensions and widespread work stoppages in 1975 and 1976.

Manpower Requirements

The forest industry directly employs about 300,000 workers or approximately 3 percent of Canada's total employed labour force and in 1976 paid more than \$3 billion in salaries and wages. The spatial distribution of this labour force across Canada and in the major industry segments is indicated in Table 82. The different industry mix in the various regions is also noteworthy. For example, Ontario and Quebec account for about 70 percent of total employment in the paper and allied industries but for only about 42 percent in the logging and wood industries.

TABLE 82

Number of Employees by Industry Group and Region, 1976

| | <u>Wood</u> | <u>Paper & Allied</u> | <u>Logging</u> | <u>Total</u> | <u>Percent</u> |
|------------------|-----------------------|-------------------------------|----------------|---------------|----------------|
| | (number of employees) | | | | |
| British Columbia | 44,645 | 20,404 | 20,154 | 82,203 | 30% |
| Prairies | 9,675 | 4,576* | 2,338 | 16,589 | 6% |
| Ontario | 19,868 | 45,645 | 7,694 | 73,207 | 26% |
| Quebec | 25,239 | 45,923 | 13,135 | 84,297 | 29% |
| Atlantic | <u>6,662</u> | <u>12,700*</u> | <u>6,557</u> | <u>25,919</u> | <u>9%</u> |
| Canada** | 106,089 | 130,207 | 49,878 | 285,215 | 100% |

Source: Statistics Canada

* Estimated due to confidentiality restrictions.

** Includes a relatively small number of employees in the Yukon and Northwest Territories.

While the total number of workers employed in the forest industry has shown only marginal growth over the last decade because of productivity improvements and closure of a number of marginal operations, the increased use and sophistication of technology in harvesting and manufacturing has resulted in a significant shift in the level of skills required. The continuing mechanization of logging operations, for example, has greatly increased the demand for heavy equipment operators and heavy duty mechanics. This type of labour is highly mobile and the forest products industry has experienced difficulty in competing with other industrial sectors such as construction for their manpower requirements. Competition for other skilled tradesmen such as hydraulic specialists, millwrights and electricians is also keen, particularly in the more remote locations.

It is anticipated that manpower requirements in the forest industry will be moderate over the next five years, reflecting continuing productivity improvements and lower rates of growth in industrial output. As shown in Table 83, the 6.8 percent increase in manpower requirements in the forest industry by 1981 is significantly below the 12.6 percent increase expected for the industrial composite as a whole. On a regional basis, B.C. followed by Central Canada and the Prairies are expected to show the most rapid overall growth in employment. These estimates are based on the Department of Employment and Immigration's COFOR (Canadian Occupational Forecasting Program) System and should be regarded as upper bounds because of fairly optimistic assumptions regarding GNP/GDP.

TABLE 83

Estimated Manpower Requirements in the Forest Products Industry, 1976-81

| <u>Sector</u> | <u>1976</u> | <u>1981</u> | <u>Percent Change</u> |
|--------------------------|----------------|----------------|-----------------------|
| Forestry (logging) | 79,895 | 84,900 | 6.3 |
| Pulp and paper | 100,973 | 106,800 | 5.8 |
| Wood industries | <u>118,914</u> | <u>128,500</u> | <u>8.0</u> |
| Total forest industry | 299,782 | 320,200 | 6.8 |
| Total industrial average | - | - | 12.6 |

Source: Department of Employment and Immigration.

Manpower Supply Prospects

The supply of labour available to the forest products industry will depend on the trend in wages and other compensation relative to other industrial sectors. It will also be influenced by overall demographic trends and by such factors as working and living conditions in addition to the many complex and subtle factors that shape the attitudes of individuals towards work in the forest products industry. A number of important trends that will shape the total labour supply picture in Canada over the next two decades include:

- . Reduced rate of growth in the Canadian labour force.
- . Decrease in the number of younger workers (14-24 years) entering the labour force.
- . Continued upgrading in educational levels.
- . Further increases in female participation rates.

The expected reduction in the growth of the Canadian labour force is likely to adversely affect the labour supply situation in all industries including the forest products industry. As a result, all sectors of the forest products industry could well face a situation of relative labour shortage depending on their ability to compete with other industrial sectors in bidding for the services of labour.

After 1980, the growth rate of young people in the labour force is expected to decline significantly (in absolute as well as proportional terms) to 1990, but to increase thereafter. Also, after 1982 the number of young people coming out of the educational system will start to decline although the proportion of the working population with secondary and post-secondary education is expected to increase substantially during the next decade with corresponding drops in the proportion of people with lower educational levels. These developments reflect to a considerable extent (i) the decline in fertility rates beginning in the late fifties and (ii) the labour force influx of children whose parents were born during the post World War II baby boom.

The 25 to 54 year age group, on the other hand, is expected to grow at a sustained rate to 1984 and to decline thereafter (in growth terms) to the end of the century. One of the factors contributing to sustained growth in this group is an anticipated increase in the participation rates of women following 1980. This reflects in part the entrance of women born during the postwar years into the labour force after child rearing and increased job opportunities for women as well as structural changes in the role of women in the labour force.

The participation rate of males in the 25 to 54 group, on the other hand, has been high since the beginning of the century and is not likely to change dramatically over the coming decades. For the younger age group (15 to 24 years) participation rates are likely to be maintained.

Wages

Wage rates have increased more rapidly in Canada than in the United States during the 1970s which in some cases has resulted in the elimination of Canada's traditional wage advantage over the U.S. forest products industry. Table 84, derived from Sandwell Management Consultants Limited "Analysis of Manufacturing Costs in North American Forest Products Industries", outlines the wage rates in effect in the

latter part of 1976 and the early part of 1977, in the pulp and lumber sectors in selected regions in North America. Payroll additives, or fringe benefits, are expressed as a percentage of direct wages. They include employer-paid benefits such as vacation and holiday pay, pensions, workers' compensation, unemployment insurance, medical and dental services, and health and welfare insurance. Cost of living allowances have been included as direct wages. The percentage payroll additives have been multiplied by the mill average to arrive at an estimated total average labour compensation.

TABLE 84

Hourly Wage Rates and Total Labour Compensation
by Product and Region, 1976

| | | <u>B.C.</u> | <u>B.C.</u> | <u>N.</u> | <u>N.E.</u> | <u>S.E.</u> | <u>N.W.</u> |
|---------------------------|-------------|--------------|-----------------|-------------|-------------|-------------|-------------|
| | <u>Unit</u> | <u>Coast</u> | <u>Interior</u> | <u>Ont.</u> | <u>Que.</u> | <u>U.S.</u> | <u>U.S.</u> |
| <u>Market Pulp</u> | | | | | | | |
| Hourly wage rates* | | | | | | | |
| - base rate | \$/hr | 6.89 | 6.89 | 7.00 | - | 4.70 | 5.96 |
| - journeyman mechanic | \$/hr | 9.30 | 9.30 | 9.03 | - | 8.60 | 8.23 |
| - mill average | \$/hr | 8.20 | 8.20 | 7.95 | - | 7.60 | 7.86 |
| Payroll additives | % | 23 | 20 | 30 | | 22 | 30 |
| Total labour compensation | \$/hr | 10.09 | 9.84 | 10.34 | | 9.27 | 10.22 |
| <u>Lumber</u> | | | | | | | |
| Hourly wage rates* | | | | | | | |
| - base rate | \$/mh | 6.89 | 6.89 | 5.97 | 4.25 | 3.10 | 5.87 |
| - journeyman mechanic | \$/mh | 9.30 | 9.30 | 8.58 | 5.20 | 4.90 | 8.50 |
| - mill average | \$/mh | 8.05 | 8.00 | 7.27 | 4.50 | 3.70 | 6.12 |
| Payroll additives | % | 27 | 21 | 29 | 23 | 23 | 35 |
| Total labour compensation | \$/mh | 10.22 | 9.68 | 9.38 | 5.54 | 4.55 | 8.26 |

Source: Sandwell Management Consultants Limited, 1977, "Analysis of Manufacturing Costs in the North American Forest Products Industries", Department of Industry, Trade and Commerce.

* U.S. and Canadian dollars considered at par.

A combination of low hourly wage rates and payroll additives results in the U.S. South having the lowest labour costs in North America. Labour costs in British Columbia are clearly the highest in North America in the lumber sector but about the same as Northern Ontario and the Northwestern U.S. in the pulp sector. The figures indicated in the table do not reflect the recent depreciation of the Canadian dollar which has effectively reduced Canadian wage rates by more than 15 percent. While the wage gap between the U.S. South and other regions in North America will likely close up somewhat following labour negotiations over the next several years, high labour costs in Canada continue to be a major concern.

In comparison to other industrial sectors in the Canadian economy, all five forest product sectors indicated in Table 85 are above the industrial composite average weekly earnings but are below certain sectors, such as construction, with which they compete for the services of various skilled trades.

TABLE 85

Average Weekly Earnings in Selected Canadian Industries,
by Rank and by Industry Grouping, December, 1977

| <u>Industry</u> | <u>Average Weekly Earnings (dollars)</u> |
|--|--|
| 1. Petroleum refineries | 387.33 |
| 2. Mining, incl. oil and gas | 362.65 |
| 3. Metal mining | 361.35 |
| 4. Construction | 346.75 |
| 5. <u>Pulp and paper mills (mfg.)</u> | 344.20 |
| 6. <u>Breweries (mfg.)</u> | 335.43 |
| 7. Smelting and refining (mfg.) | 331.80 |
| 8. Coal mining | 328.82 |
| 9. Primaries metal industries (mfg.) | 325.87 |
| 10. Non-metal mining (exc. fuels) | 325.73 |
| 11. Transportation equipment (mfg.) | 320.29 |
| 12. <u>Paper and Allied Industries (mfg.)</u> | 319.26 |
| 13. Boilers and plate works | 310.11 |
| 14. Truck transportation | 293.20 |
| 15. Concrete products (mfg.) | 292.48 |
| 16. Machinery (mfg.) except electrical | 283.28 |
| 17. Tires and tubes | 283.07 |
| 18. <u>Saw, shingle and planing mills</u> | 282.91 |
| 19. <u>Wood products</u> | 273.36 |
| 20. <u>Logging</u> | 256.51 |
| <u>Industrial Groupings</u> | |
| Construction | 346.75 |
| Mining | 362.65 |
| <u>Forestry</u> | 249.22 |
| Transportation, communication and other utilities | 299.33 |
| Manufacturing | 271.89 |
| Industrial composite | 252.74 |
| Finance, insurance and real estate | 236.41 |
| Trade | 195.54 |
| Service | 175.22 |

Source: Statistics Canada

Manpower Planning

It would appear that the difficulties the forest products industry might have in obtaining sufficient labour are likely to become more acute over the next decade, in view of demographic trends and the apparent growing unwillingness of many workers to commit themselves to life in isolated communities.

One of the major manpower problems in the forest products industry is the turnover question. Three basic reasons are often cited: geographical, job related, and sociological. It would appear that the isolation factor is of central importance in explaining high turnover rates in logging and sawmill operations. Other factors frequently cited include lack of adequate housing/school facilities, insufficient wage differentials between more remote locations and urban centres, monotony of jobs with little promotional prospects or opportunities for job mobility, low work status and lack of practicable training programs for new workers. Also, turnover problems are often more severe in the smaller scale operations. Larger mill operations tend to have greater scope for company manpower planning (training, recruitment, selection), seniority provisions and social amenities associated with more established communities.

The increasing number of workers with secondary and post-secondary education in the labour force suggests that jobs in the forest industry will have to be made more interesting both psychologically and economically in order to attract a stable workforce. While there are serious technical and practical problems to overcome in the working environment of the forest industry, consideration should be given to effecting improvements through such means as job redesign, job rotation and flexible work and vacation schedules.

The problems of attracting workers and high turnover strongly suggest a need for industrial manpower planning covering all occupational levels. Overall corporate plans require that employment stability be as thoroughly considered as other factors of production. To maximize the effectiveness of corporate manpower plans, they should be developed and co-ordinated with manpower activities of the public sectors, both provincial and federal.

Labour-Management Relations

The Canadian forest products industry has a high rate of unionization. About 70 to 80 percent of the total number of production workers in the industry are unionized, a major portion by international unions, compared with an estimated 33 percent for all industrial sectors in Canada. This rate is close to 100 percent for the larger companies in the industry. The majority of woodlands workers in Canada are unionized and often belong to the same union as the production workers. Exceptions include those woodlands workers employed by contract loggers where the number of employees per firm may be small.

By comparison, unionization of woodlands workers in the United States is less widespread although there are regional differences. Unionization is high in the Pacific Northwest but is usually only 50 percent or lower in the North and practically non-existent in the U.S. South. In the latter area, forest access is seldom difficult since much of the timber is growing in former cotton plantations and this, together with the land ownership pattern, encourages the operation of a large number of small, owner-operated logging firms. Table 86 indicates the degree of unionization in the industry together with a representative list of unions.

TABLE 86

The Number of Union Employees in Canada's Forest Industry

| <u>Sector</u> | <u>No. of Agreements</u> | <u>No. of Union Employees</u> | <u>Selected Unions</u> |
|-----------------------------|------------------------------|-----------------------------------|---|
| Logging | 42 | 21,760 | International Woodworkers of America; United Brotherhood of Carpenters and Joiners of America; Canadian Paperworkers Union; Federation of Paper and Forest Workers; Quebec Woodworkers Federation. |
| Wood | 24 | 40,160 | International Woodworkers of America; United Brotherhood of Carpenters and Joiners of America; Quebec Woodworkers Foundation; National Federation of Building and Wood Workers Incorporated; Canadian Paperworkers Union. |
| Paper and allied industries | 134 | 69,850 | Canadian Paperworkers Union; Federation of Paper and Forest Workers; United Paperworkers International Union; Pulp, Paper and Woodworkers of Canada; International Printing and Graphic Communications Union. |
| TOTAL | 200 | 131,770 | |

Source: Department of Labour

It is worth noting that there is a basic difference in approach to collective bargaining in British Columbia and Alberta compared to Eastern Canada. The unions in Western Canada typically have large memberships and bargaining by the companies is usually conducted through associations. Collective bargaining is more fragmented in the East although the trend is towards larger company groupings.

The deterioration of labour-management relations in the industry as evidenced by the prolonged and widespread labour disputes in 1975 and the early part of 1976 are a major concern of both management and labour. For example, the number of man days lost due to strikes in the paper and allied industries in 1975 accounted for about 27 percent of the total number of man days lost in all industry groups in Canada, considerably above the time lost in previous years. The fact that these strikes took place during a period of high mill inventories and declining market demand only illustrated the seriousness of the situation.

Both labour and management have placed a high priority on finding ways and means to reduce industrial conflict and to improve the process by which collective bargaining is conducted in the industry.

The Canadian Pulp and Paper Association and several of the major unions have examined the industrial democracy models in Europe for possible application in Canada but neither have indicated any enthusiasm for making major changes to the existing adversary approach to collective bargaining. The more responsible position taken by both sides in British Columbia at the end of 1977 and in Central and Eastern Canada in 1978 would suggest that the industrial relations climate has improved considerably since 1976.

ENERGY

The forest products industries are a major user of energy. The pulp and paper industry in particular is highly energy intensive, accounting for about 90 percent of the sector's total energy purchases and for about 25 percent of all purchased energy used by Canadian industry. Consequently, cheap energy has been one of the main attractions to potential investors in the Canadian pulp and paper industry.

Fuel and electrical power purchased by the forest industries in 1976 represent 6 percent and 10 percent respectively of total domestic consumption. In addition to outside purchases, some segments of the industry obtain a substantial portion of their energy needs from the burning of their own wastes. The use of internally generated energy from wood waste is expected to become somewhat more widespread in the Canadian pulp and paper industry as Canadian energy prices continue to rise to world levels.

Availability of Energy

Recent developments in the foreign crude oil supply may place constraints on the availability in the foreseeable future of heavy fuels, particularly for mills in eastern Canada. This may be further aggravated by an unfavourable shift to a relatively greater production of gasoline and lighter fuels from available crude.

Energy Costs

The cost of energy to pulp and paper mills in 1972 averaged 7.8 percent of the value of shipments, almost equally divided between fuel and electrical power.

For a short period, pulp and paper prices rose more quickly than energy costs and by 1974 the latter had fallen to 7.2 percent of value of shipments. By 1976, however, the figure had risen to 9.2 percent. There is considerable variation in this average cost depending on product, mill location, and whether companies own hydro-electric power generation facilities. A recent study* of pulp and paper manufacturing costs in selected Canadian mills indicated purchased energy costs to vary from 4 to 13 percent of total manufacturing costs for kraft pulp and 7 to 16 percent for newsprint. Even higher energy costs exist in some Maritime Provinces' newsprint mills due to recent major increases in the price of electrical power. The same study indicated even higher energy costs for U.S. pulp and paper manufacturers, viz., 16 to 34 percent of manufacturing costs for newsprint and 7 to 12 percent for kraft pulp.

* Sandwell Management Consultants Limited, 1977, "Analysis of Manufacturing Costs in the North American Forest Industries", Department of Industry, Trade and Commerce.

Energy Conservation

Emerging energy policies have stressed the need for energy conservation to reduce the large trade deficit expected by increased fuel imports and to lessen the capital expenditures required to increase domestic supplies. Due to its size and high energy demand, much attention has centred on the pulp and paper industry as one area in which substantial energy savings might be achieved. However, it should be noted that the pulp and paper industry's current contribution to Canada's international trade balance is over 10 times as great as the value of all the purchased energy used by the entire industry.

Almost all major energy conservation measures in the industry will require expensive capital equipment such as bark burning boilers, waste heat boilers, by-product power generation equipment, extra stages of multiple effect evaporation and counter-current washing, heat exchange equipment and insulation. The pulp and paper industry has pledged to reduce its unit energy consumption by 12 percent by 1980. A rough estimate of the capital costs associated with this reduction is in the order of at least \$150 to \$200 million. Further increases in the energy conservation target would increase these estimated capital costs exponentially. On a purely commercial basis, the savings in energy should at least cover the operating and capital-related fixed costs of these conservation methods in order to justify investments of this magnitude and at the same time remain internationally competitive.

Most of the North American pulp and paper industry was built at a time of low energy costs. Such conditions did not justify the installation of energy conserving equipment to the degree incorporated into mills in other countries where higher energy costs prevailed. Swedish pulp and paper mills, for example, appear to require on the average approximately 30 percent less purchased fuel than Canada's mills for the same production. There may be a tendency to assume that because Canadian energy prices have recently increased many energy conserving projects, formerly rejected as uneconomic, may now become attractive. Unfortunately, since equipment costs and interest rates have increased almost as rapidly as energy costs, many energy conservation projects may be no more attractive at present than when the plant was originally built. Also, the addition of equipment to an established mill is generally more expensive than installation in a new mill. Hopefully, a moderation in equipment cost increases coupled with higher energy price levels may tend to improve the attractiveness of various energy conserving projects now under consideration.

Potential for Energy Conservation and Self-Sufficiency

It is beyond the scope of this report to cover in detail the numerous possibilities for energy conservation. Some potential areas, however, warrant discussion.

Sulphate (Kraft) Pulp -- The kraft pulp mills (44 percent of Canadian pulp and paper capacity) appear to offer the most opportunity for fuel conservation in the pulp and paper industry, provided that the anticipated return on the investment required to recover heat more efficiently from the burning of waste liquors and other wood wastes is adequate. The average purchased energy of eight single product kraft mills, representing approximately 15 percent of Canadian kraft capacity, was 2.6 barrels of oil equivalent (BOE) in fuel, plus 727 kilowatt-hours (KWH) of electrical energy per ton of product in 1972. The average for all Swedish kraft pulp mills in 1974* was 1.0 BOE/T plus 533 KWH/T. A recent comparison** between a new Scandinavian and a good North American kraft pulp mill indicated purchased energy requirement of 0.4 BOE/T and 0 KWH/T for the former and 1.2 BOE/T and 100 KWH/T for the latter. Assuming that the Canadian sample is representative, the differences in kraft pulp fuel consumption per ton are sufficient to account for all of the 30 percent difference between the Swedish and Canadian pulp and paper industries as a whole.

Sulphite Pulp -- About two-thirds of all Canadian sulphite pulp is unbleached and is produced in newsprint mills for direct use in newsprint, in which it forms about 25 percent of the total fibre content. While somewhat less energy is required for its production than for kraft pulp, few newsprint mills are equipped to evaporate and burn spent sulphite pulping liquor to recover energy. Consequently, purchased energy requirements for this grade are similar to those of kraft.

The other third is bleached sulphite market pulp. Of seven mills producing this grade, four have, or will soon have, liquor recovery plants. Sulphite mills with such facilities should require somewhat less purchased energy than kraft pulp, due to characteristically lower pulping temperatures and simpler bleaching processes. However, technical aspects related to the sulphite liquor recovery process largely offset these energy savings.

Mechanical Pulp -- Although the manufacture of mechanical pulp requires less fuel than chemical pulp, it consumes large quantities of electrical energy (approximately 1900 KWH/ton). In most newsprint, 70 to 80 percent of the fibre is conventional groundwood and the remaining 20 to 30 percent is either unbleached sulphite or semi-bleached kraft pulp, used to impart strength to the paper. One emerging trend is the replacement of this mixture with thermo-mechanical pulp (TMP), a relatively new grade with strength properties approximately equivalent to that of the mixture replaced.

* Energiehushallingen i Massa och Pappersindustrin (Swedish Pulp and Paper Association) January, 1975.

** TAPPI, 57 No. 10, pp. 117 to 121, October, 1974.

The main reason for such change would be elimination of sulphite spent liquor pollution but it would also achieve a 10 to 20 percent wood saving. However electrical energy requirements for the manufacture of newsprint would increase by 40 to 50 percent. In most cases, the value of the wood saved would exceed the incremental power cost, but the savings are insufficient to encourage the large capital investment required. As the extra power involved could be substantial (up to an additional 2 percent of national consumption) continuing research is needed to find methods of reducing power requirements of TMP.

Newsprint and Other Papers -- Apart from the energy used to produce the pulps required for paper-making, major quantities of electrical energy are required to run the paper machine itself, and heat is required to dry the paper. The heat requirements for newsprint drying average about 5 million BTU/ton, but can vary from 3.5 to 8. Obviously, there is room for improvement in many cases, but such improvement usually requires major capital expenditures, which may or may not be justified by the value of the potential energy savings.

Use of Bark and Wood Waste as Fuel -- Nearly half of the total bark and wood waste produced in Canada is burned as hog fuel, mainly in pulp and paper mills. The bulk of the unused wood waste is located in sawmills. The high capital-related and operating costs for burning hog fuel versus oil coupled with high transportation and handling costs, limit the cost-effectiveness of utilizing purchased off-site woodwaste by pulp mills.*

It can be expected, however, that pulp and paper mills will tend to increase the use of bark as a fuel and also to upgrade facilities to use it more efficiently as the price of fossil fuels continues to increase.

Co-Generation

The use of the low pressure steam exhausted from steam turbines of electrical power generators as a source of process heat is looked upon as a major energy conserving measure in Scandinavian countries. This method, known as co-generation or back pressure generation, provides 30 percent of the Swedish paper industry's electrical power needs, while simultaneously supplying process heat. In most Canadian plants the price of purchased electrical power relative to the price of fuel has been too low to encourage installing such facilities. The process is somewhat more attractive where excess on-site wood waste can be utilized as fuel.

Recycling -- Increased recycling of waste paper has been suggested frequently as a means of conserving energy in the pulp and paper industry. In reality, its potential is relatively small (less than 0.5 of the industry's energy consumption) in view of Canada's low population density, long shipping distances, and the low ratio of domestic consumption of paper to domestic production.

* The recently announced (1978) Forest Industry Renewable Energy (FIRE) program should improve the economics of using wood waste for fuel.

POLLUTION ABATEMENT

Pulp and Paper

As one of the largest industrial water users, in 1971 the pulp and paper industry was the first industrial sector in Canada to have national regulations established to limit wastewater discharges. Although substantial capital has been applied to the control of air emissions and on solid waste disposal, the majority of effort and capital expended has been on the abatement of wastewater discharges.

As illustrated in Table 87, total capital expenditures on pollution abatement by the industry up to and including 1977 is reported to be \$718 million. This total includes \$569 million spent on water pollution abatement and solid waste management and \$149 million on air emission controls. In terms of water pollution abatement this expenditure has resulted in an 82 per cent reduction in suspended solids and a 49 per cent reduction in biochemical oxygen demand on a per unit of production basis.

TABLE 87

Pollution Abatement Expenditures -- Canadian Pulp and Paper Industry

| | <u>Water</u> | <u>Air</u> | <u>Total</u> | Total Cost per Ton Annual Capacity of Wood Pulp**** (\$) |
|--|---------------------|------------------|--------------|--|
| | (\$ millions) | | | |
| Past capital expenditures* | 569*** (1959-77) | 149 (1965-75) | 718 | 28 |
| Estimated additional** expenditures to meet federal requirements | 1,034 | 207 | 1,241 | 49 |
| Total expenditures past and future | 1,603 | 356 | 1,959 | 77 |

* Source: Canadian Pulp and Paper Association

** Source: Environment Canada EPS 3-WP-77-11 September 1977 (Note: air emission costs were estimated to be an additional 20 per cent of water costs derived from experience in the U.S.)

*** Includes \$44 million spent on solid waste management in the period 1970 to 1977 inclusive.

**** Tons wood pulp capacity (1977): 25,409,000 ADT

Although sizable amounts of capital have already been expended on pollution abatement by the Canadian industry resulting in substantial improvements to the environment, major additional amounts of capital will be required. For example, the projected future capital costs for air and water pollution abatement in the Canadian pulp and paper sector, excluding what has already been spent, is estimated to be approximately \$1.25 billion or \$49 per ton of pulp capacity. This amount does not take into account additional costs which may be incurred due to more stringent provincial requirements in some locations.

Mills in Canada which were operating before 1971 have been dealt with in the application of federal guidelines for wastewater abatement on an individual basis and have varying schedules of compliance to meet established levels. This flexible schedule allows time for needed R&D in the field of pollution abatement. Mills constructed in Canada after 1971 have been required to meet federal limits on commencement of their operation.

Canadian federal pollution abatement limits were designed in part to promote the installation of pollution abatement techniques and facilities as an integral part of an efficient operation. This approach provides for systems which ideally can maximize the utilization of resources and benefits to the environment while minimizing energy requirements and operating costs.

The approach taken to regulate pollution in the pulp and paper industry in other countries has been different than that taken in Canada. In the U.S., for example, all mills were required to meet a specified level by 1977. Because of the shorter time frame and the difference in the pollution limits established in the U.S., expenditures on pollution abatement in the U.S. to date have been higher than in Canada. It is estimated, however, that the eventual costs in Canada to meet existing federal requirements, will be comparable on a unit of production basis to those spent in the U.S. to meet its requirements.

Data on pollution abatement expenditures in other countries are not readily available and are difficult to assess where government subsidies are involved. The Swedish government, for example, provided a 25 percent subsidy to the industry in the period 1969 to 1974 on capital spent to upgrade technology and to ease pollution problems.

The Canadian newsprint sector which relies on the sulphite process to provide chemical pulp furnish in newsprint faces a difficult pollution problem. This sector of the industry is centered in Ontario, Quebec and the Atlantic Provinces and has particular problems relating to the disposal of spent sulphite pulping liquor. Due to the size and the age of these mills, the installation of suitable abatement facilities such as recovery and incineration may not be economically feasible.

This segment of the industry is confronted with an estimated capital expenditure of approximately \$250 million or a total of \$70 per ton annual capacity of sulphite to achieve compliance with the specified national levels. Thermomechanical pulping is viewed by some to be a viable alternate to sulphite in newsprint and a solution to the environmental problem. However, production of TMP presents other problems in terms of a high energy demand and limitations in the end use of the TMP product.

Although national guidelines for air emissions have yet to be established in Canada and the projected cost data on air pollution abatement is highly speculative, it is envisaged (based on U.S. experience) that the ultimate costs, particularly for kraft mills, will be substantial. Approximately 40 percent of Canadian kraft mills, mostly of pre-1970 vintage, have overloaded recovery systems causing odour and particulate emission problems. Possible modifications and controls could include increasing furnace capacity, adding black liquor oxidation, upgrading precipitators, incineration of non-condensibles and the addition of scrubbers.

Solid waste disposal of material such as bark and wood residue from pulp and paper operations is not a major concern since the majority of such material generated on site is consumed as fuel. Disposal of mill solids taken from wastewater streams, however, can be a problem if these solids are not suitable for incineration or cause problems when used as landfill. The trend is to minimize the amount of mill solids generated by maximizing the in-plant recovery of useable fibre.

Industry funds directed toward pollution abatement research have been increasing steadily in recent years and at present comprise an estimated 30 percent of the total research expenditure in the industry. In addition, the Co-operative Pollution Abatement Research (CPAR) program* under which the federal government supports pollution abatement research in the pulp and paper industry has provided for significant advances in pollution abatement techniques as well as increasing the fundamental knowledge of pulp and paper processing.

Wood Products

The wood products industries, by the nature of their processes, are not large industrial water users and those that do generate wastewaters generally have the capacity of containment within the processing system. Although regulations will likely be established for certain materials used in the manufacturing processes, such as in wood preserving, this is not expected to be a major constraint on the industry. Air emissions and solid waste disposal are the main environmental problems facing this sector. The capital costs involved in instituting environmental controls in the wood products industries have not been estimated.

* As a result of efforts to restrain government spending, the CPAR program is discontinued as of April 1, 1979.

Although national guidelines have not been set on air emissions or on the disposal of solid wastes from such operations, provincial restrictions and pressures have been brought to bear, particularly on those operations in or near urban centres. Concerns centre on incinerators used to burn wood waste, volatiles from dryers, and contamination due to runoff from solid waste landfill sites. About 70 percent of wood waste generated from such sites is incinerated or disposed as landfill, while less than 30 per cent is utilized as fuel.

This industry sector now produces about 60 percent of the total wood waste generated in Canada. Since this material represents a potential fuel source, considerable effort will be made, in the light of higher fuel prices, to utilize more effectively the large amounts presently incinerated or disposed of as landfill. Capital costs required to better utilize waste as fuel are high and such systems do not remove the necessity to abate air emissions. For example, the total cost of a hog fuel fired boiler system, excluding the cost of pollution controls, can be twice that of a system which utilizes conventional fossil fuels to produce the same amount of power.

Summary

Pollution abatement has become a significant factor which must be considered when viewing the future development of the industry, particularly with respect to the pulp and paper sector. Environmental requirements will place a major demand on capital, will continue to be a significant operating cost item, and will necessitate a large share of the R&D effort. Although major improvements and advances have been made by the industry in the field of pollution abatement, there remains a considerable amount yet to be done. Since such endeavours will exert considerable cost pressure, there is a continuing need to establish policies and pollution abatement regulations which will provide for increased overall industrial efficiency through modification of existing manufacturing processes and the development of new technology. A fundamental intent of such policies and regulations should be to provide adequate protection for the environment while minimizing the economic impact on the industry.

This section has dealt mainly with the policies and programs of the federal government in the area of environmental protection. It is emphasized, however, that the provincial governments have, and continue to play, a major role in this area. Because of concerns raised over problems created by the multiplicity of jurisdiction, both in terms of regulations and implementation, a comprehensive review is being undertaken. This review examines the various aspects of environmental protection legislation as well as respective federal/provincial roles in the implementation of pollution abatement requirements.

TRANSPORTATION -- MILL TO MARKET

Background

The cost and reliability of transportation is an important factor in the competitive position of the Canadian forest products industry in overseas markets, in the important U.S. markets for lumber, newsprint and other forest products, and in the domestic market. As a percentage of delivered price, transport cost varies between 10 percent and 40 percent depending on product and distances to market which relatively, on the average, are long. The industry is, therefore, very dependent upon an efficient rail, highway and water transport system to provide adequate capacity, equipment and terminal facilities and to move its raw materials and products at competitive rate levels.

During a period of acute difficulty in 1971, the pulp and paper industry and the federal government agreed to try to improve the competitive position of the industry in the area of transportation cost. During this same period, Canadian National and a group of newsprint companies undertook a study to find out if moving newsprint cars in trainload lots and distributing the newsprint by truck from central warehouses would serve to reduce the overall cost. The study which cost more than \$1 million, half of which was funded by the federal government, concluded that significant line haul savings would be realized but that increases in warehousing, inventory and local transportation costs would cause an overall deficit. In completing the study, however, opportunities for significant material handling cost reductions were identified and personnel involved in the project gained a broader perspective of the newsprint industry and distribution networks used.

At about the same time, some of the larger pulp and paper companies applied to the Canadian Transport Commission and to the U.S. Interstate Commerce Commission (ICC) for lower railway rates to the large eastern U.S. market. The rate situation was reviewed in detail by the regulatory authorities of both countries during the ensuing four years, but the application was dismissed by both the ICC and the CTC.

Transportation by Mode

Rail -- About 50 percent of the industry's pulp and paper and 40 percent of its lumber, plywood and other wood products are shipped by rail and thus the industry is one of the largest customers of the Canadian railways. The bulk of this rail tonnage goes to U.S. markets, moving at through one-factor rates that are negotiated with both Canadian and U.S. railways. This negotiation is sometimes difficult, since any appeals against the level of the rates are subject to the jurisdiction of the separate regulating authorities in each country, namely the Canadian Transport Commission and the U.S. Interstate Commerce Commission.

Water -- Canada ships about two million tons of wood pulp and 700,000 tons of newsprint to Europe each year, as well as heavy tonnage of lumber from West Coast ports to U.S. coastal cities and to Pacific Rim and European markets. On the Great Lakes, rail cars of newsprint are ferried across Lake Superior from Thunder Bay to Duluth to final destinations in the U.S. midwest, and both wood pulp and newsprint are shipped from Northern Ontario lake ports to U.S. lake ports.

Motor Transport -- Motor transport moves about 10 percent of total forest products (by value) shipped to the U.S. each year, 40 percent of this being sawn lumber and 40 percent newsprint.

Trucks offer more flexible service to short-distance markets at rates competitive with the railways and eliminate some of the transit damage problems, particularly for newsprint, inherent in rail service. Highway costs can be competitive with rail for relatively shorter hauls (up to around 500 miles) but this varies where either rail or truck total tonnage over the route is unbalanced and the carrier is using forest products as a back-haul.

Current Problems

The following outlines a number of transport problem areas which have been brought to the attention of the government by the forest industry and an indication of how these are being dealt with.

International Rates -- As mentioned earlier, the Canadian railways and highway carriers carry significant volumes of lumber, newsprint and wood pulp from Canadian mills to U.S. markets. For a number of reasons, international joint rates, both truck and rail, may not always be set at as low a level to some U.S. destinations as rates from competing U.S. mills to the same U.S. markets. In addition, the U.S. regulatory agency, the Interstate Commerce Commission, has from time to time granted U.S. carriers permission to increase their rates, and these increases are applied to the international through rates even though the charges for the Canadian portion of the movement is regulated by the Canadian Transport Commission. For many years there has been an unofficial understanding between the railways, truck companies (and their rate associations), and the shippers that Canadian rates must be competitive to allow Canadian lumber and newsprint mills to meet price competition in the large U.S. market. In the past few years, however, there have been a number of situations in which the action of U.S. carriers has put the Canadian shippers at a disadvantage and neither the shippers, the Canadian railways, the trucking companies, nor the CTC have the means of obtaining satisfactory adjustments from the ICC. The forest industry, among others, is on record with the Ministry of Transport that it would welcome the setting up of some kind of international joint commission with authority to regulate international rail and motor rates.

Coastal and Intercoastal Shipping -- For a number of years the government has been considering the desirability of revising Part XV of the Canada Shipping Act dealing with the coasting trade of Canada. Legislation which contained a clause designed to restrict to ships of Canadian registry the right of providing service between Canadian ports was introduced in Parliament early in 1977.

Concern about this change was strongly expressed by some of the provinces and by shippers on the grounds that lower-cost foreign ships were presently engaged in the coasting trade and the requirement to use Canadian ships would increase the cost of this transportation. Furthermore, British Columbia lumber producers are convinced that to prohibit the prospect of chartering foreign ships to carry lumber to Eastern Canadian ports would encourage the railways to increase their transcontinental railway rates which are maintained at a water competitive level.

Because of these concerns the coasting trade provisions were removed from the legislation and a "position paper dealing with the policy implications of a (new) proposed Bill on the Coasting Trade of Canada" was tabled in the House in the latter part of 1977.

This paper is an attempt to reconcile the objections to the earlier bill and has been discussed with industry and the provinces. A modified bill will be presented to Parliament.

Freight Rate Appeals -- Appeals to the rail regulating authority in Canada on freight rate questions are set out in Section 23 of the National Transportation Act (NTA). It requires the appellant to first seek leave to appeal which, if granted, leads to a formal hearing and an eventual decision. Because of the high legal cost and length of time involved, only a few appeals have been made since the passing of the NTA in 1967. (A case involving several Eastern Canadian newsprint shippers initiated in 1971 took six years to be resolved.) Since two of the three cases involved pulp and paper companies, the forest industry has been strongly advocating a simplification of the appeals procedure and the imposition of a time limit for rendering decisions.

Although a previous bill addressing these issues did not receive a final reading, similar new transport legislation will be proposed.

The new legislation may also eliminate the "captive shipper" section of the NTA which has proved ineffective over the years and has been the subject of various briefs to the government from the industry.

Transport Related Studies

Concurrent with the preparation of new legislation mentioned above, Transport Canada is also engaged in several major multi-modal freight projects centered on particular regions. These projects are designed to forecast the demands that will be placed on various transport systems in the next 15 to 20 years, to determine the adequacy of present capacity and to plan the financing and construction of a transportation infrastructure that will meet the country's needs. These are inter-disciplinary, inter-agency projects with a major long-term planning function. An example is the Pacific Rim Access Project which focuses on access from Western Canada to Pacific Rim markets via B.C. ports. It has completed Stage I which examined freight movements of major bulk commodities to 1990, the potential bottlenecks that could occur in rail and terminal capacity, and some preliminary alternatives or solutions. The East-Central Access Project focuses on similar freight forecasting and capacity problems in areas which provide access to points of export/import or inter-modal transfer. For example, this project has focused a great deal of attention on future capacity problems which may occur in the Thunder Bay area. It will also examine transport problems and options for Northern Ontario.

Research and Development

There is a good deal of transportation research and development activity relative to the forest products industry throughout Canada. Here is a brief overview:

Industry -- The industry is noted for its expertise in efficient utilization of all transport alternatives to minimize costs; it maintains a private research bureau which keeps abreast of developments in this field.

Universities -- In the university community, the most active centres of transportation research are the University of British Columbia Centre for Transportation Studies, Queen's Canadian Institute for Guided Ground Transport, and the Transportation Centre at York University. The first focuses primarily on economic systems operations research while the latter two cover both economic and technological research into transport problems.

Federal Government -- Within the federal government several agencies maintain expertise in this area. The Transportation Development Agency is well-known for its research capability. The Canadian Transport Commission and Transport Canada are continuously engaged in research into all aspects of transport, including the transport of forest products.

Outlook

Transportation costs will continue to bear heavily on delivered costs of Canadian forest products, primarily because of the distances between the manufacturing operations and the markets. As a result of the distance factor, any cost-reducing opportunities revealed by research are not expected to make a major impact. Transport costs will continue to increase along with the other costs of doing business but at an accelerated rate because of the heavy dependence on fossil fuel.

On the other hand, because of its size the forest industry generally maintains a good negotiating position with all carriers and it has traditionally provided itself with superior traffic management expertise.

It faces the recurring and expensive problem of shortages of railway equipment but, again, because of the heavy tonnages at its disposal it is in a position to demand the best transport service that is available and to consider ways and means with the carriers of enhancing its supply of rolling stock.

New government-sponsored facilities such as Lynnterm in Vancouver and the proposed new forest products terminals at Nanaimo and Prince Rupert will improve traffic flows in British Columbia. New improvements in the Thunder Bay area will serve to provide the transport capacity that the industry may require for future expansion. Modification of port facilities in Quebec would assist exports of lumber from that region. A recently established ferry service for rail cars from Baie Comeau to Matane provides better access to United States rail networks for forest products. Export shipments from eastern ports have improved with the new Forest Products Terminal at Saint John, New Brunswick.

RESEARCH AND DEVELOPMENT

Although the Canadian forest products industry can in many respects be considered a mature industry, a more intensive and long term commitment to research and development is essential, if the industry is to make the most of its substantial resource base and technical expertise. Technological innovation is an essential ingredient for longer term increases in productivity and profitability. In addition to the more traditional areas of process and product development, the rising world demand for chemical, pharmaceutical and food products available from wood together with the potential of wood as an energy source call for highly imaginative, mission-oriented research in all areas.

Research and development in the forest products sectors is carried out by government, individual companies and associated research institutes, universities and numerous equipment suppliers to the industry.

Government R & D is primarily directed towards the forest resource and the wood products sector and in the case of the federal government has been largely carried out by the regional research centres and forest product laboratories of the Canadian Forestry Service and to some extent by the National Research Council.

The larger companies account for the bulk of industrial R & D and about 90 percent of intramural R & D in the Canadian forest products industry is in the pulp and paper sector. The central institute for the pulp and paper industry is the Pulp and Paper Research Institute of Canada (PPRIC), an organization financed by member companies of the Canadian Pulp and Paper Association and by the federal government through the provision of buildings, capital facilities and project grants. With the exception of a few companies, industrial R & D in the wood products sector is strongly oriented to process development which is mostly undertaken by equipment suppliers in co-operation with producing mills. R & D in the logging sector is mainly carried out by equipment suppliers and by the Forest Engineering Research Institute of Canada (FERIC) which was established in 1975 and is jointly funded by industry and the federal government.

Pulp and Paper

A partial list of major technology improvements that have occurred in the pulp and paper industry is presented in Table 88. While most such developments are the result of the combined efforts of many organizations, those in which Canadian organizations played a leading or significant role in the initial stages are identified in an attempt to convey some appreciation of the overall Canadian contribution.

TABLE 88

Selected Major Technological Improvements in the Pulp and Paper Industry

| Projects | Groups Involved in Research and Development | | | | |
|-----------------------------------|---|---|------------------------------|----------------------------------|-----------------------------|
| | Canadian Pulp and Paper Companies | Canadian Universities and Research Institutes | Canadian Equipment Suppliers | Foreign Pulp and Paper Companies | Foreign Equipment Suppliers |
| Tomlinson Recovery Boiler | Lead Role | | | | Supportive Role |
| Centricleaner | Lead Role | | | Lead Role | Supportive Role |
| Cowan Screen | Lead Role | | Supportive Role | | |
| Magnetite Pulping | Lead Role | | | | |
| Arbiso Pulping | Lead Role | | | Lead Role | |
| Vanillin | Lead Role | | | | |
| Rotogravure Newsprint | Lead Role | | | | |
| Offset Newsprint | Lead Role | | | | |
| Prehydrolyzed Kraft | Lead Role | | | | |
| Dissolving Pulp* | Lead Role | | | Lead Role | |
| Foil Drainage Elements | Lead Role | | Supportive Role | | Supportive Role |
| Twin Wire Formers | Supportive Role | Lead Role | Supportive Role | | Lead Role |
| Papri Dryer | Supportive Role | Lead Role | Supportive Role | | |
| Chlorine Dioxide Manufacture | | | | | |
| and Bleaching | Lead Role | Lead Role | | | |
| Centrisorter Screen | Supportive Role | | | Supportive Role | Supportive Role |
| Thermo-Mechanical Pulping | Lead Role | Supportive Role | | Lead Role | Lead Role |
| Chemi-Thermo-Mechanical Pulping | Lead Role | | | | |
| Kamyr Continuous Digester | | | | Supportive Role | Lead Role |
| Kamyr Continuous Diffusion Washer | | | | Supportive Role | Lead Role |
| Converflo Slice | | | | | |
| Synthetic Paper Machine | | | | | |
| Fabrics | Supportive Role | | Supportive Role | Supportive Role | Lead Role |
| Winder Technology | Supportive Role | | | | Lead Role |
| Flakt Pulp Dryer | | | | | Lead Role |
| High Intensity Presses | | | | | Lead Role |
| "Swimming" Roll | | | | | Lead Role |
| Flexible Roll | | | | | Lead Role |
| Computer Control | Supportive Role | Supportive Role | Supportive Role | Supportive Role | Lead Role |

* Developed both in Canadian and foreign laboratories but never exploited in Canada.

TABLE 88

Selected Major Technological Improvements in the Pulp and Paper Industry

| <u>Projects</u> | <u>Groups Involved in Research and Development</u> | | | |
|---|--|--|---|---|
| | <u>Canadian Pulp and Paper Companies</u> | <u>Canadian Universities and Research Institutes</u> | <u>Canadian Equipment Suppliers</u> | <u>Foreign Pulp and Paper Companies</u> |
| Oxygen Bleaching | | | | Foreign Equipment Suppliers |
| Vacuum Deculator | Supportive Role | | | Lead Role |
| Cotrelle Precipitator | | | | Lead Role |
| Remote T.V. Monitoring | | | | Lead Role |
| Polyethylene Coated Board | | | | Lead Role |
| Milk Carton Board | | | | |
| Coating Technology | | | | |
| Electrostatic Paper | Supportive Role | | | Supportive Role |
| Carbonless Copy Paper | | | | Supportive Role |
| Specialized Paper and Board Products | Supportive Role | | | Supportive Role |

It is apparent that the majority of past technological improvements originating in Canada's pulp and paper industry have come from the individual companies. This emphasizes the importance of maintaining a strong R & D presence in the companies as well as in central institutions.

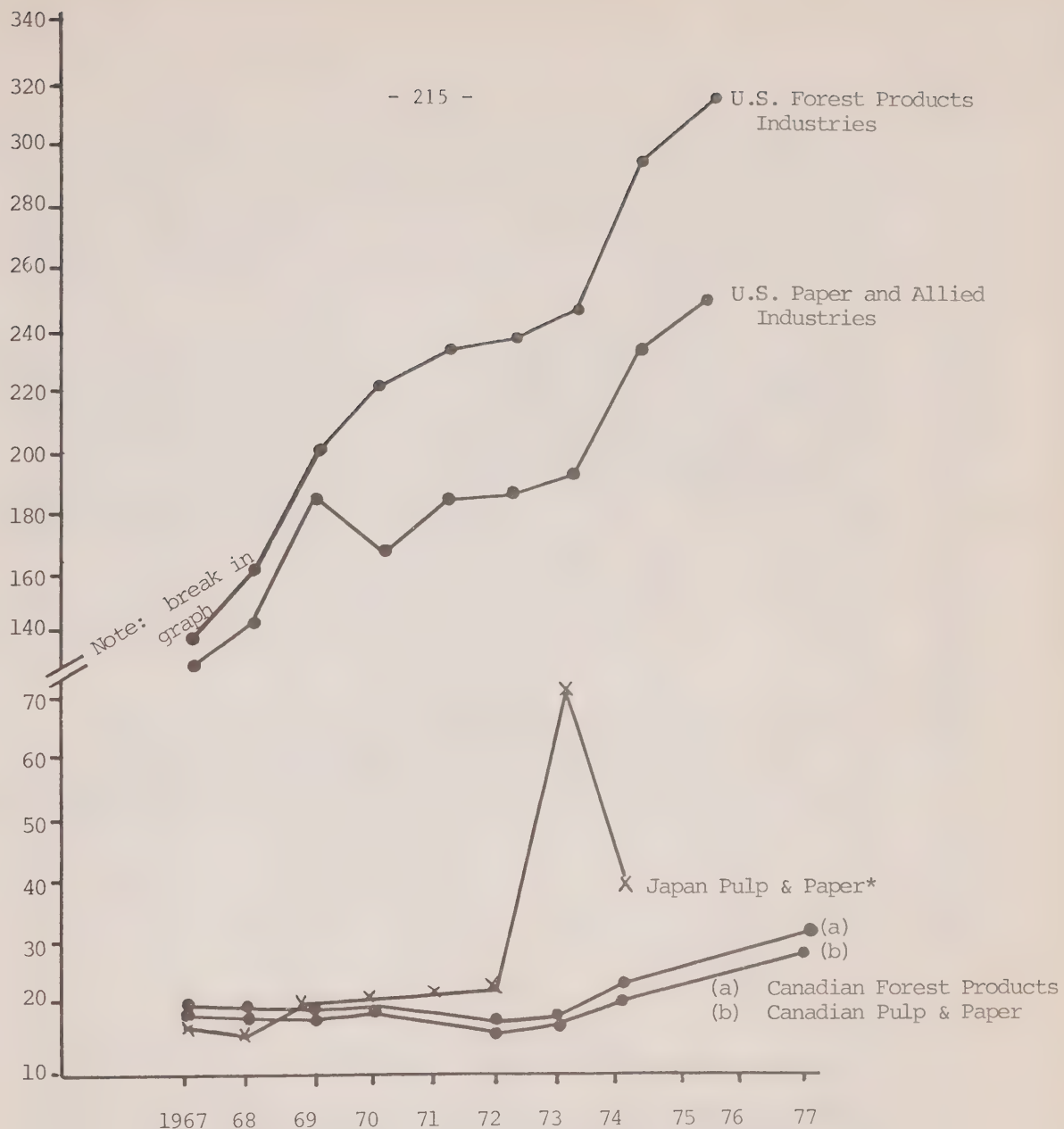
On the foreign scene, equipment suppliers have played a major role in developing many of the major technological improvements in the industry. It is important to note that foreign equipment suppliers in the major pulp and paper producing countries, particularly in Scandinavia, are often affiliated with pulp and paper companies. In addition, major improvements in technology are often based on suggestions and ideas of operating and research personnel in pulp and paper companies, who frequently collaborate with suppliers in the early stages of development and become heavily involved in subsequent plant trials and modifications required to make the innovation practical. This relationship between companies and equipment suppliers is a significant factor in successful commercialization of technology. Moreover, government support for R & D can be very substantial in certain foreign countries.

While Canada is one of the world's major pulp and paper producers and is considered by many to be in the forefront of technological innovation, industrial R & D expenditures in the industry have not kept pace with inflation, sales or R & D expenditures in competing countries or even with respect to other industrial sectors in Canada.

The following graphs compare historical trends in Canada's industrial R & D expenditures in forest products with the total Canadian manufacturing sector and with the pulp and paper industries in the United States and Japan.

There has been a downward trend in industrial research spending as a percent of sales during the early 1970's by Canadian manufacturers as a whole, but an even sharper decline in pulp and paper. As a result R & D spending in the pulp and paper industry as a proportion of total Canadian industrial R & D in manufacturing declined from 6.5 percent in 1967 to 4.2 percent in 1975.

These graphs also indicate a higher level of research spending in the U.S. and Japanese pulp and paper industries in both relative and absolute terms. R & D expenditures expressed as a proportion of sales have been reduced by about one-half since 1970 in Canada's pulp and paper industry whereas the industry in the United States and Japan has more or less maintained its position.



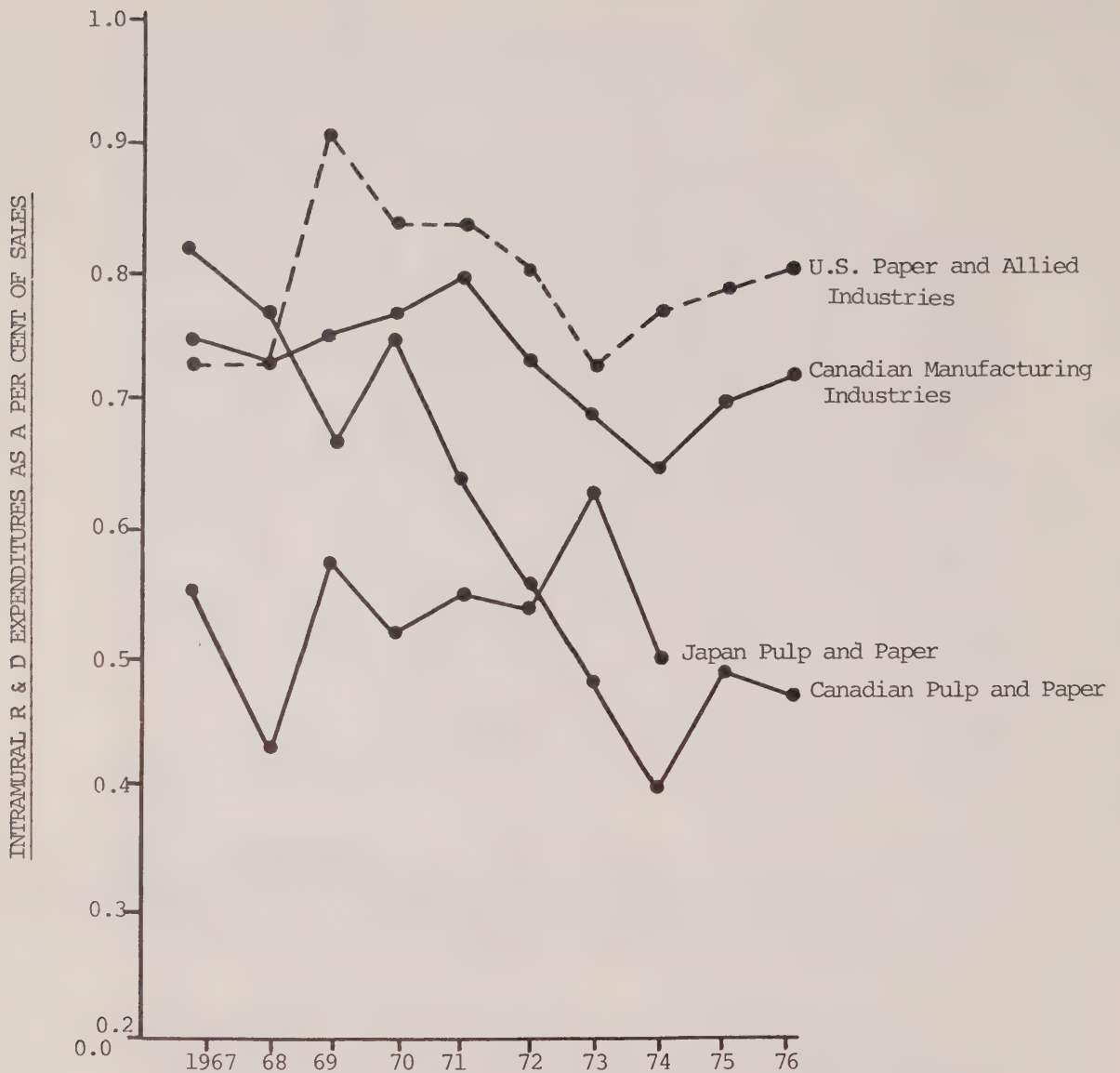
* R & D expenditures for Japan are total of intramural and expenditures to research institutes.

Sources: Research and Development in Industry (U.S.)
1975 National Science Foundation NSF 77-324
p. 30 Table B-3

Industrial R & D Expenditures in Canada 1974-76
S.C. 13-302 p.18 Table I.

1970-77 R & D in Canadian Industry --
Selected Tabulations from 1975 Survey S.C. Aug. 1977.

Canadian Pulp and Paper Mission to Japan Oct. 1976.



Source: Research and Development in Industry (U.S.)
NSF 77-324 1975

Industrial R & D Expenditures in Canada 1974-76
S.C. 13-302

1970-77 R & D in Canadian Industry --
Survey S.C. Aug. 1977

In current dollars, the level of support has diminished significantly from 1975 to 1977. In constant dollars (1968) the drop in support is seen to be even more significant, declining from \$4.5 million in 1972 to about \$1.1 million in 1977. The curtailment of IRDIA and other program revisions with the introduction of the Enterprise Development Program in IT&C accounted for a major part of the decrease in R & D support.*

The financial problems facing a number of Canadian pulp and paper companies in the early 1970's led to substantial cuts in research staff which have not yet fully recovered to their original strength. Between 1970 and 1975 the total number of professionals employed by nine of the larger pulp and paper companies represented on the CPPA Technical Section Research Committee fell from 217 to 172, a drop of 21 percent. This was only partially offset by a corresponding increase of 20 professionals on the staff of PPRIC over the same period.

Table 89 indicates that both industry and government support to central research institutes expressed as a percentage of sales is considerably less in Canada than in Finland or Sweden.

TABLE 89

Support of Central Pulp and Paper Research Organizations
in Finland, Sweden and Canada

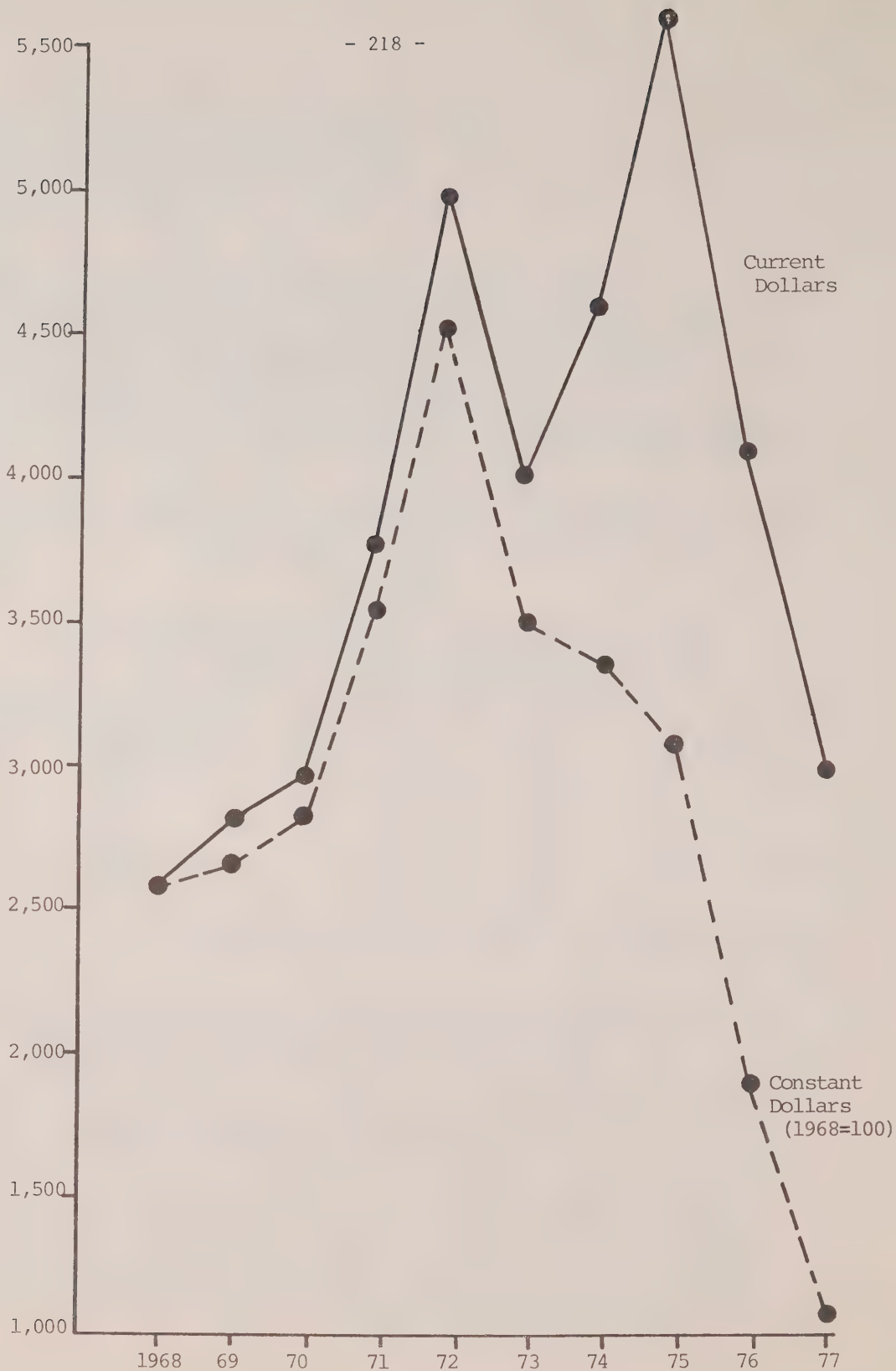
| <u>Institute</u> | <u>Year</u> | <u>Total Support as % of Industry Sales</u> | <u>Industry Contribution as % of Industry Sales</u> |
|------------------|-------------|---|---|
| FPPRI (Finland) | 1975 | 0.25 | 0.20 |
| | 1974 | 0.18 | 0.14 |
| STFI (Sweden) | 1975 | 0.22 | 0.10* |
| | 1974 | 0.20 | 0.10* |
| PPRIC (Canada) | 1975 | 0.11 | 0.08 |
| | 1974 | 0.10 | 0.07 |

Source: Department of Industry, Trade and Commerce

* Division between industry and government contributions estimated.

* Some modification to the above has occurred as a result of recent structural changes to support of R&D by the federal government, e.g., the discontinuation of the Department of Environment's Co-operative Pollution Abatement (CPAR) and Demonstration of Pollution Abatement Technology (DPAT) programs, the creation of the Energy from the Forest (ENFOR) program and the placing of the Forest Product Laboratories under the control of industry. In addition, further improvements in tax credits were proposed in the November 1978 budget speech. Federal tax credits of 5 to 10 percent, depending on location, of current and capital R&D expenditures were introduced in the March 1977 federal budget, and the April 1978 budget permitted firms to claim an extra 50 percent deduction from taxable income for R&D expenditures over and above the average for the past three years.

FEDERAL SUPPORT TO R & D IN PULP AND PAPER (mainly extramural)
(thousands of dollars)



Federal government support of R & D in the pulp and paper industry, mostly extramural in nature through major departmental programs of the Department of Environment, National Research Council and Department of Industry, Trade and Commerce, is illustrated in the following graph for the period 1968 to 1977.

While Canada has contributed her share of R & D, it is obvious that the relatively higher level of spending in other countries will likely result in their achieving a major portion of new technological advances with a shorter lead time to implementation. It is recognized that there is a free flow of technical information within the industry and much of the innovation resulting from R & D tends to become available on an international basis. However, it is also important to note that an R & D capability must be maintained at least to a level which will ensure that Canadian companies will have the ability to avail themselves of these new technological advances. Effective technology transfer requires an ongoing commitment to R & D programs and organizations which will provide the needed expertise to ensure implementation of new technology. Moreover, there are many problems unique to the industry in Canada which only a Canadian R & D effort can address and which is beyond the minimal R & D effort referred to above.

As the long term results of R & D are only evident several years after the fact, it is always difficult to assess whether sufficient R & D activity is taking place at any given time. Benefit cost analyses are difficult to apply although there are many examples in retrospect where R & D has greatly contributed to pulp and paper industry development. Two criteria that provide some guidance are:

- (a) The relative spending on R & D by competitors and by other industries. The previous discussion suggests that the Canadian pulp and paper industry is lagging in this respect.
- (b) The number and seriousness of industry problems which improved technology may help solve. Some of the more urgent problems are:
 - The capital intensive nature of the industry, which, coupled with rapidly increasing construction and equipment costs, makes development of new capacity or even optimization of existing facilities an expensive proposition;
 - The energy intensive nature of the industry combined with rapid increases in energy prices;
 - The large volumes of pollutants produced by some pulping processes, coupled with the almost prohibitive cost of effluent abatement facilities;

- Diminishing availability and escalating costs of wood, the largest single cost component in pulp manufacture;
- Rapidly rising costs of labour, chemicals and other supplies.

R & D can help solve some of these problems by:

- Development of new or improved pulping, bleaching and papermaking processes, etc. which are more efficient with respect to capital, energy, raw materials and operating costs and/or are less polluting. For example, a new process recently developed by Canadian International Paper Company Limited (CIP) for a new type of newsprint pulp promises substantial savings in wood and electrical power and will generate less pollution than conventional newsprint production methods.
- Development of equipment which is less capital intensive per unit of production. A recent example is the multi-stage diffusion bleaching tower. It is expected that two such towers in series will eventually be able to replace entire pulp bleacheries, including most auxiliary equipment, and in addition, reduce the consumption of bleaching chemicals. (This tower has been developed by a Scandinavian equipment supplier who licenses a part of the basic technology from a Canadian inventor).
- Improvements to automatic control to increase productivity (e.g., the computer control system for kraft pulping, recently developed by Consolidated-Bathurst Limited).
- Development of new methods to monitor plant effluents for pollution, identification of cause and effect relationships of pollutants on the environment, methods to decrease the volume of water required for processing and improved pollution abatement methods. For example, the effluent free mill concept, a Canadian development currently under trial in the new kraft pulp plant of The Great Lakes Paper Company Limited, with partial support from the federal Department of Environment.
- Seeking ways to reduce energy consumption in the present processing methods of the industry (e.g., better methods of mechanical water removal from paper to reduce the amount of heat required for drying).

While the above examples indicate that the industry is making progress in finding some solutions to its problems, the seriousness of these problems argue strongly for an acceleration of this activity. The data on research spending suggests that the trend may be going in the opposite direction.

Patent Laws

In June 1976, the Department of Consumer and Corporate Affairs published a working paper proposing major revisions to the Canadian patent system. One of the main recommendations was to the effect that the Canadian patent system should be placed on trial for a 10-year period. If at the end of that time the worth of the system had not been proved sufficiently to cause Parliament, in the first 20 days of its subsequent session, to extend or replace the Patent Act, then no more patents would be issued.

The trial period for patents along with other proposals in the working paper caused serious concern in the private sector who felt implementation of these proposals would have a stifling effect on R & D in Canada. As a result of the adverse response, many of the contentious recommendations were withdrawn for further consideration.

Although it is recognized that revision to certain aspects of the Canadian patent system would be desirable, the private sector, including the CPPA and PPRIC, has clearly indicated that a workable patent system must be maintained if an essential R & D effort is to continue in Canada.

Wood Products

Intramural research and development expenditures in Canada's wood products industries have historically been considerably below those in the pulp and paper sector, amounting to \$2.6 million in 1977 or about 0.05 percent of total shipments in the wood industries compared with \$32.8 million and 0.4 percent of sales in the pulp and paper industry. This relatively low level of R & D in wood products can be attributed, in part, to the long tradition of wood as a prime building material in a multitude of end-use applications in Canada and elsewhere; little, if any, market pressure to upgrade many of the primary products of the industry such as lumber; the relatively free international flow of technology and the dominance of equipment suppliers in the development of new processing technology. In addition, the industry is characterized by a large number of small firms with only a few companies of sufficient size to independently support their own research organization.

It is clear, however, that a more concentrated R & D effort by companies in the wood product sector is required over the coming years to effectively respond to anticipated changes in market demand and the declining quality and size of available timber resources. Priority areas for a greater R & D involvement include the development of new uses for wood and wood residues, new products, such as reconstituted wood products, and new design information for wood with reference to building codes and product standards.

It is also evident that because of the fragmented nature of R & D activity in the wood product sector, there is a growing need to consolidate research effort, to identify priorities and to increase the level of R & D expenditures in industry.

At the federal level, the two forest product laboratories* of the Canadian Forestry Service have accounted for the bulk of government R & D in the wood products sector. The annual budget for these two laboratories was \$5.7 million in 1977, more than twice the level of intramural R & D expenditures in the wood products industry.

The research program of these laboratories is referred to a number of ongoing industry advisory committees to ensure that the needs of industry are being addressed. Some of the recent developments achieved through this mechanism have been heavy salt-based preservatives, non-leaching fire retardants, adhesives based on spent sulphite liquor, panel products based on the more efficient utilization of the whole tree, surface treatments to improve plywood gluing, treatments to protect lumber during shipment, a variety of methods to improve the processing of wood, and basic information for the engineered uses of wood in structures and housing.

Other activities have included the development of means to provide for the more efficient utilization of the whole tree, including harvesting and processing of residues, and the use of those species of trees not now used to their full potential. In addition, the federal laboratories have contributed to the development and provision of technical information for standards and codes regulating the uses of wood as well as acting as a focal point for the industry in the development and transfer of technology.

In terms of processing technology, the development and wide scale application of high speed, small log processing systems of either Canadian or foreign origin in Canada's lumber and plywood industries during the 1960s and 1970s has put Canada in the mainstream of new technology in this area around the world. In fact, exports to world markets represent a significant part of the total sales volume of several Canadian equipment producers supplying these types of systems. While the development of new processing technology for the Canadian wood products industry is primarily carried out by equipment suppliers, the collaboration of producing mills played a major role in the successful introduction and modification of the new, small-log processing systems in Canada.

* In late 1978, the federal government began to place these laboratories under the control of industry resulting in the establishment of Forintek Canada Corporation.

The term small-log processing system refers to a wide range of different types of machine design and processing principles. Some of the more notable advances in machine design that have been standardized and widely used in Canada's lumber industry over the last decade include a total manufacturing process utilizing profile chippers coupled to saws and re-manufacturing edgers, high strain band mill headrigs and resaws, and overhead arbour guided thin kerf saw edgers. The emphasis at the present time is on electronic sensing systems for classification of material and machine setting to optimize processing. In the plywood industry, the most significant technological advances in the processing of small diameter logs include the development of retractable lathe chucks, lathe chargers, veneer stackers, panel feeders, grading and sawing systems.

Forest Engineering Research Institute of Canada (FERIC)

FERIC is an independent organization which has been operating since 1976 with a yearly budget of about \$2 million provided jointly by industry members and the federal government.

The cost of sourcing raw material is recognized as a prime factor in determining the future growth prospects of Canada's forest industry. The FERIC program is therefore designed to assist the industry in improving the efficiency of wood harvesting operations and in the development and introduction of innovation to meet present and future needs. The major areas covered by the current work program are:

- harvesting machines and systems (design, evaluation, efficiency and operations research);
- people (variation in work performance, human factors in machine design and motivation);
- transportation systems (development of systems and equipment applicable to all forms of transportation, at various stages in the movement of wood between the stump and the mill);
- environment (aesthetics, noise, safeguards on sensitive sites, resource management constraints and improved wood utilization).

The work program, while national in scope is undertaken in eight provinces and is designed to account for regional differences. In addition, FERIC provides a technical liaison service to transfer and disseminate technical and research results to all interested parties. Providing an interface between the equipment supplier and the end-user is considered a key role of FERIC.

MARKETING AND DISTRIBUTION

With a large proportion of the products of the Canadian forest products sector destined for export markets, marketing and distribution are becoming increasingly important factors in ensuring long-term competitiveness. While selling is a principal function of marketing, other activities include market research, product planning and development, standards and quality control, channels of distribution, pricing and credit, transportation and warehousing, and product promotion. These aspects of the marketing and distribution function in the forest products industry are examined in this section. Export related government assistance programs are outlined in Appendix I.

Wood Products

The marketing organizations common to the Canadian wood products industry for the most part reflect the market orientation and distribution channels of the principal products. Sales of softwood lumber and plywood require a different marketing approach than do sales of hardwood lumber and plywood. Because most of Canada's softwood lumber is exported, international market conditions are a major determinant of Canadian marketing strategies and pricing of softwood lumber in Canada and abroad. The major exception would be small sawmills spread throughout the country that service essentially local requirements.

In the U.S. market which absorbs some 80 percent of Canadian exports, most Canadian producers deal primarily with wholesalers, who in turn sell to independent retailers, large builders or manufacturers of factory built dwellings.

Softwood lumber has a history of wide and frequent price fluctuations over the business cycle. Because the grading rules and practices used by the industry are virtually the same in Canada and the United States, softwood lumber sold in the North American market can be considered a more or less homogeneous product. This fact, coupled with the extremely large number of producers and a lack of trade barriers in either market, results in the lumber market approaching perfect competition with supply and demand the prime determinants of price. As a result, the market for lumber can be extremely volatile with prices responding daily to supply and demand pressures.

In offshore markets, considerable success has been achieved by consortia types of arrangements which enjoy significant economies resulting from large volume sales. Buyers have available from one source, a broad range of products as well as continuity of supply, frequent shipments and assured quality. For the producer, an export marketing consortium offers improved access to major world markets at the lowest available transportation costs and a lower per unit sales cost that includes many extra marketing services. Canadian companies shipping on behalf of B.C. producers are among the world's largest exporters of wood products.

The Canadian lumber industry typically markets to the European Economic Community lumber species and sizes that are not available from other sources. Complementary standard construction grade lumber products are also supplied to the European distribution system to balance the main product lines. The pricing of standard lumber items in Western Europe is based on supply and demand factors, whereas in the Eastern Bloc countries, it is based on foreign exchange requirements. Specialty lumber items generally sell at premium prices due to the specifications and the limited sources of supply.

Over 80 percent of Canadian production of softwood plywood is sold in the domestic market. Prices essentially reflect production and distribution costs with export prices having some impact. Over the past few years, Canadian producers have faced higher costs than their U.S. counterparts with the result that Canadian selling prices have been higher than U.S. prices. In addition, U.S. prices generally fluctuate more frequently than is the case in Canada.

Most of the major Canadian producers have their own warehousing facilities in key centres across Canada to service smaller regional accounts. Large builders frequently purchase their requirements directly from the mills. Almost all overseas shipments of softwood plywood originate on the West Coast and are shipped by the two largest export shippers generally in combination with lumber cargoes. These shippers maintain large dock and warehousing facilities in Britain and have an extensive agency organization in Western Europe.

Wood product promotion is carried out by individual companies and by the Council of Forest Industries of British Columbia (COFI), which acts on behalf of member companies in areas of common interest except industrial relations and sales. COFI member companies and affiliated members produce 90 percent of the total value of the British Columbia forest industry. While the Council is not involved in the direct selling of products, member committees and staff work to create an acceptance and a demand for lumber, plywood, shingles and shakes produced by member companies. A major part of the COFI budget goes into overseas promotion, through the Co-operative Overseas Market Development Program (COMDP), which is jointly funded by the federal Department of Industry, Trade and Commerce, the British Columbia Ministry of Economic Development and COFI. COFI also maintains a North American promotion program.

While the softwood lumber industry in Central and Eastern Canada has a strong North American market orientation, interest in exporting to offshore markets is growing, particularly to the EEC, North Africa and the Middle East. Many companies have developed new offshore business in recent years and export promotion efforts by several eastern industry associations have increased considerably over previous years.

A majority of Canadian hardwood lumber and plywood production is sold in various industrial markets in Canada. Considering the limited size of the Canadian market, very few Canadian producers have their own sales organizations. The majority of firms use a middleman who may be a broker, a manufacturer's agent, a selling agent, or a wholesaler specializing in the sale of hardwoods. Typically, the agent is paid on a commission basis while the wholesaler takes possession of the lumber and adds a markup.

Hardwood plywood sold as decorative wall panelling is typically distributed through retail lumber dealers and building supply centres. Canadian suppliers generally service the markets through their own sales organizations. In addition, a sizable quantity of panelling is sold directly to manufacturers of secondary products. The selling function is often supported by consumer oriented advertising, exhibits at local home shows and literature encouraging the use of the product in innovative applications.

Domestically produced hardwood plywood wall panelling is priced well above imported tropical hardwood panelling but offers advantages of style and quality. As such, supply and demand factors are less important in pricing policy.

Pulp and Paper Products

Marketing organizations in the Canadian pulp and paper industry reflect the distribution patterns of the industry's main product lines. Sales of such high volume products, as chemical market pulp and newsprint, require a substantially different marketing approach than most other paper and paperboard products that are geared for the domestic market and sold in relatively small lots.

Canadian market pulp producers sell their chemical pulp grades in domestic and world markets directly through their own sales organizations or through local sales agents. In recent years, there has been a trend by major Canadian market pulp producers to set up sales offices abroad in order to capitalize on the growing net deficit of chemical pulp in the EEC and Japan. Subject to prevailing market conditions, about three-quarters of wood pulp is sold through the negotiation and implementation of long-term supply contracts. In some instances, in order to secure spot tonnage opportunities from areas in the world not covered by their own international sales network, Canadian market pulp producers utilize large international pulp brokers or trading companies.

Like the Canadian market pulp producers, Canada's newsprint producers have also established marketing organizations and channels of distribution to market their newsprint throughout the world. In both Canada and the United States, newsprint is marketed through company owned and maintained sales organizations. For offshore export markets, Canadian newsprint producers sell the largest portion of newsprint through local sales agents, but sales can be made directly to publishers through their own sales organizations.

Sales of other paper and paperboard products, excluding bulk packaging paper and board grades, are basically directed toward the domestic market. The bulk of fine paper output is sold through merchants. For many years fine papers were distributed by independent merchants who were not exclusive to any one mill. Over the years, the majority of fine paper producers have integrated forward by acquiring merchants and paper converters.

In one case, a Canadian fine paper producer acquired a United States sales organization, a move which has resulted in the export of appreciable tonnage to the U.S. market. Future penetration of the U.S. market may depend, in part, on the ability of Canadian fine paper producers to establish new merchant and converting networks in the United States.

Selling costs for fine papers, other than transportation, are substantially higher per ton of product than for pulp and newsprint, owing to such factors as number of grades, more limited market areas and higher inventory requirements. As a percentage of sales, however, the cost comparison is less striking since fine paper products have a much higher value per ton than pulp or newsprint.

In Canada, the major packaging papers and board products, sack kraft, corrugating medium and kraft linerboard are marketed on a direct basis to the customer. For export markets, local sales agents are utilized. There is, however, a degree of direct inter-corporate sales of kraft linerboard and sack kraft paper by Canadian producers who have operations in the European Community.

The marketing of sanitary tissue, kraft papers and boxboard grades is primarily oriented to the domestic market. Exports to the United States and offshore markets are through a mix of inter-corporate sales, local sales agents or on a direct arm's-length sales basis. Because of its consumer orientation, the sanitary tissue element of the Canadian pulp and paper industry is quite different from most other segments of the industry. Finished products are marketed through the food industry distribution mechanism, requiring substantial advertising and promotional costs of a kind that are not incurred by other pulp and paper sectors.

Over the past few years a number of significant trends have become apparent in marketing and distribution of Canadian pulp, paper and paperboard products to export markets. Such trends are the movement away from arm's-length agents toward direct selling and the negotiating and implementation of long-term supply contracts for market pulp and newsprint. The joint equity investments between Canadian and foreign companies that contributed to the accelerated rate of British Columbia pulp mill expansion in the late 1960's could be a forerunner of further ventures of this type to ensure long-term supply of wood pulp, possibly in combination with selected papers and paperboard products. Continuing opportunities for joint ventures abroad, including financial investment, distribution arrangements, and technological exchanges, coupled with possible investment in third countries by Canadian and foreign companies, could lead to very significant changes in the traditional marketing and distribution of Canadian pulp and paper products in the future.

Since there are essentially no tariff barriers to pulp and newsprint in North America and Western Europe, these markets are highly competitive in nature. Prices in world markets are primarily determined by the underlying economic factors of supply and demand, and contracts (which include price) between buyers and sellers generally reflect these factors. To the extent that Canadian exporters are marginal suppliers, some discounting takes place and spot sales are often sold at prices lower than those sold on published lists. These spot markets do provide some price benefits to producers under high demand and short supply conditions.

International trade in other paper and paperboard products is frequently subject to significant tariff and non-tariff barriers. Even with tariff protection of 10 to 15 percent, imports have gained an increased share of the Canadian market. Prices are generally higher in Canada than in the U.S. because of the higher cost structures resulting from small markets and problems of scale and because of high tariffs. Even during periods of low demand, prices for domestically sold products are not likely to decline significantly below the level of total unit costs facing the industry. High cost structures provide a floor for price reductions.

In the transportation of pulp and paper products, cost saving innovations already are positively influencing the distribution of these products. For offshore markets, the trend to large unit shipments using barges and larger ocean-going vessels is pronounced. The greater co-ordination of railroad, warehousing and other distribution modes as well as improvement in materials handling are also important changes.

MARKET ACCESS

Market access for forest based products is affected by many factors including tariff and non-tariff barriers, transportation costs, specialized channels of distribution, and inherent resistance against new products and their application. The following section deals primarily with the tariff and non-tariff barriers affecting Canada's access to prime export markets and Table 90 summarizing tariffs on selected forest products is included at the end of the section. The other factors are discussed in the profile sections.

For the primary forest products, such as lumber, pulp and newsprint, tariffs are minimal and do not represent major problems. The higher valued forest products such as plywood, fine paper, paperboard and manufactured wood products generally face tariff rates that preclude or hinder exports to major markets. Non-tariff barriers create access problems for most exported forest products.

Softwood Lumber

Canada is one of the few countries that can significantly increase its production of softwood lumber. In order to realize the full potential of our timber resources, Canada would benefit from better access to offshore markets for basic lumber products. Most of Canada's major customers are net importers of softwood lumber.

United States -- There are virtually no tariff or non-tariff measures in our lumber trade with the U.S. Canada has traditionally supplied about 98 percent of the softwood lumber imported into the United States. The U.S. market relies on Canadian lumber to supply a growing percentage of the annual lumber consumption in that country.

While basic lumber products such as framing lumber, enter the U.S. market duty free, there are inhibiting tariffs on further manufactured lumber. There is an increasing trend for lumber products to be further manufactured at the source into products such as precision-cut building components and prefinished products. The tariff rates on these further manufactured lumber products range from 5 percent to 16 2/3 percent.

Offshore Markets -- The Canadian lumber industry seeks to diversify its markets in order to assure continued growth and minimize the effect of fluctuations in demand and prices. In the major offshore markets, there are various constraints that impede the desired growth of our lumber trade. The most important of these are outlined below.

Japan -- During recent years Japan has become Canada's largest potential offshore market for lumber products. Current developments in Japan offer Canada an opportunity to expand exports of standard lumber products. As a result of the joint effort of the federal and provincial governments and Canadian industry and inter-governmental consultation between Canada and Japan, official Japanese approval has been granted to the Canadian wood frame house building system in Japan. Japanese lumber standards have also been brought more in line with those in North America.

While these developments will greatly facilitate lumber exports to Japan, a 10 percent duty is imposed on imports of whitewood lumber that includes Canada's largest lumber species group of spruce-pine-fir. As most of current and future Canadian production is in whitewoods, this tariff is a major constraint to increased levels of exports to Japan.

Imported construction lumber has, for some time, been re-inspected and re-graded on arrival at the Japanese port of entry. However, major progress has been made in resolving this disruptive and costly procedure which has been a major impediment to Canadian lumber exports to Japan.

European Economic Community (EEC) -- The EEC countries have traditionally represented one of the major offshore markets for lumber products. While rough lumber from Canada enters the EEC on a duty-free basis, a 5 percent tariff inhibits growth in sales of dressed lumber. The EEC duty on imports of dressed lumber from members of the European Free Trade Association (EFTA), including Sweden and Finland is being phased out.

Building codes in the EEC countries often militate against the use of standard Canadian lumber for construction purposes. However, considerable progress has been made during recent years in gaining acceptance for Canadian wood frame building systems and lumber standards, particularly in Britain, the Netherlands, Belgium, and France.

Australia -- As a protective measure for the domestic sawmill industry, Australia imposes a restrictive duty on the imports of smaller sized construction lumber. The level of duty drops as the size of the lumber increases with the larger sizes subsequently being remanufactured by the domestic industry. This situation represents a significant barrier to trade in standard Canadian dimension lumber.

Others -- Due to the recent affluence of several Middle East and North African countries, they have lately expressed an interest in Canadian softwood lumber for use in housing and industrial construction. Because these countries are dependent upon imported softwood lumber, the existing tariffs that range from 4 percent to 40 percent are a deterrent to increased trade. However, product specifications and transportation costs probably represent more significant constraints to Canadian suppliers. At present, the Scandinavian and East European producers are the major exporters to these markets.

South Africa at one time was an important market for Canadian rough-sawn lumber. The tariff schedule, while not prohibitive by itself, has when combined with non-tariff measures resulted in a substantial decline in the imports of Canadian lumber. As a protective measure for domestic industry, South Africa imposes restrictions in specifications allowing only imports of products unobtainable from domestic sources. In addition, import quotas are granted once a year and are based on the importer's sales of domestic products.

Softwood Plywood

The industry is essentially oriented to the domestic market with approximately 80 percent of Canadian production sold in Canada. There is little potential for increased production of sanded grades due to the declining availability of high quality peeler logs. In order to realize the full potential of the industry, Canada would benefit from improved access to export markets, particularly to the U.S. and the EEC, for the sheathing grades.

United States -- A 20 percent U.S. duty on imports of softwood plywood effectively excludes Canadian producers from the market. The operating cost differential between U.S. and Canadian mills in certain plywood grades is also a major impediment to market penetration in the U.S.

European Economic Community -- The EEC (particularly Britain) represents about 97 percent of all Canadian exports of softwood plywood. Under the duty-free quota in the EEC for certain sizes and grades of softwood plywood, Canada competes on a global basis for the annual volume designated for each member state. For those sizes and grades of coniferous plywood not included in the quota, Canadian shippers are faced with a 13 percent Common External Tariff which does not apply to producers in Sweden and Finland. Potential exists for expanded sales of sheathing plywood but it will be necessary to meet competition from U.S. suppliers in these markets. Building codes and product standards in many EEC countries are obstacles to the marketing of Canadian softwood plywood and are being tackled by direct representations from government and industry and within the framework of the Co-operative Overseas Market Development Program (COMDP). In this regard, the waiver granted by DIN (standards) authorities in West Germany allowing use of Canadian construction plywood in residential construction has removed a major non-tariff barrier and should result in increased sales to West Germany.

Under the Community's General Preference Scheme, certain plywoods from developing countries are allowed entry under a duty-free quota and compete with Canadian products for a significant part of the market.

Japan -- The marketing of Canadian softwood plywood for construction purposes in Japan has up to the present, been very limited because of Japanese building codes, product standards and competition from domestic mills. The introduction of the Canadian timber-frame system of residential construction in 1974 has resulted in a potential market for sheathing plywood, but penetration of this market will require resolution of problems related to meeting current Japanese plywood standards. The Japanese also impose a 15 percent duty on imported plywood.

Hardwood Lumber

The industry is essentially domestically oriented with about one quarter of Canadian production exported, primarily to the United States. Approximately 80 percent of the total volume of exports is made up of the better grades of yellow birch and hard maple. The declining availability of preferred hardwood species, rather than questions of market access, is the major constraint to the expansion of the Canadian hardwood lumber industry. Since 1972, Canada has been a net importer of hardwood lumber.

United States -- A variety of hardwood products from rough lumber to machined hardwood components enter the U.S. duty free. The Canadian share of the total imported hardwood market has declined significantly from over 50 percent in 1970 as a result of increased competition from tropical hardwoods.

Offshore Markets -- Hardwood lumber is faced with essentially no tariff or non-tariff barriers in offshore markets. The major constraint in developing export trade is the declining availability of preferred hardwood species.

Hardwood Plywood

The three basic types of hardwood plywood produced in Canada include decorative wall panelling, doorskins and industrial panels. About one quarter of the volume of shipments is exported, principally to the United States.

United States -- The hardwood plywood industry is faced with 7 percent (birch) and 10 percent (all other species) tariffs that are inhibiting factors in expansion of exports to this market. There are no significant non-tariff barriers. The major competition to the Canadian product comes from Southeast Asia in the form of doorskins and from Finland for thicker industrial panels. To increase exports for industrial types of hardwood plywood, Canadian firms have been supplying a high quality product in the numerous grades, sizes and thicknesses demanded in this specialized market segment.

Offshore Markets -- The major market, the European Economic Community, has a 13 percent tariff that inhibits the development of full export potential. Under the Community's General Preference Scheme, certain tropical hardwood plywoods are allowed entry at reduced tariff rates and compete with Canadian products in the wall panelling and industrial markets.

Particleboard

The industrial particleboard industry is domestically oriented with only negligible quantities exported to date. To benefit from forecasted domestic growth as well as export opportunities, Canadian mills must become more cost competitive with U.S. producers. On the other hand, waferboard has been exported, mostly to the United States, despite a tariff.

United States -- A 10 percent duty on industrial particleboard imports effectively excludes Canadian producers from this market. The operating cost differential between U.S. and Canadian mills is such that despite a 15 percent Canadian tariff, imports from the U.S. have made major inroads in the domestic market during cyclical downturns in the U.S. market.

Waferboard, an exterior grade flakeboard, is also faced with a 10 percent tariff but this has not been a major impediment to competitive pricing against the lower grades of U.S. softwood plywood. Canada has pioneered the development of this relatively new and growing industry. About one-half of Canadian production is currently being exported to the U.S. Improved terms of access would further assist this industry.

Offshore Markets -- A large and well established domestic particleboard industry in the European Economic Community, the major offshore market, together with a tariff of 13 percent effectively excludes Canadian exports to this market. Waferboard is also faced with this tariff. This, coupled with market resistance to new products and a variety of building codes and product standards, has impeded Canadian market development initiatives in the EEC.

Wood Pulp

In both Canada and the world, the major percentage of wood pulp production is used domestically in integrated paper manufacturing facilities. Of the 15 percent of world pulp output that is traded, Canada is the major supplier accounting for about one third of world trade. Most of Canada's major customers are net importers of wood pulp.

United States -- There are virtually no tariff or non-tariff barriers in our wood pulp trade with the U.S. which is our single largest pulp market absorbing approximately 50 percent of our total exports.

European Economic Community -- The EEC countries represent the largest offshore market for wood pulp importing about 60 percent of the pulp traded internationally. Canadian producers supply about one quarter of this market.

Japan -- Japan is the third largest importer of wood pulp representing about 7 percent of world imports, of which about 15 percent is supplied from Canada. A tariff rate of 5 percent (which is applied periodically) and import licensing requirements are impediments to further market penetration. In addition, Japan continues to purchase large quantities of wood chips overseas to supply domestic producers of wood pulp.

Other Markets -- South American countries have tariff rates ranging from 5 percent in Argentina to 84 percent in Uruguay. In addition, non-tariff barriers such as foreign exchange controls and regulations, import surcharges and discriminatory purchasing practices permit control of imports in order to protect domestic pulp producers.

The development of free trade areas between countries is also a major deterrent in gaining access to protected markets. Under the New Zealand/ Australian Free Trade Area (NAFTA) agreement, Australia has granted free trade provisions to New Zealand, while pulp imports from Canada are subject to a 20 percent tariff rate when the duty free quota is exceeded.

Newsprint

Newsprint is the most important single commodity in value terms within the Canadian pulp and paper industry. More than 90 percent of Canadian newsprint production is exported.

United States -- Newsprint exports to the U.S. account for about 80 percent of total exports and represent more than 60 percent of U.S. consumption. While newsprint enters the U.S. on a duty-free basis, advantageous freight rates favouring domestic U.S. producers based in the southern states result in price competitive situations detrimental to Canadian producers.

European Economic Community -- This market is the second largest in terms of world trade. About 8 percent of all Canadian exports of newsprint is shipped to this market. Newsprint is imported under a duty-free quota adjusted annually and based on domestic production and consumption estimates. A tariff rate of 7 percent could be levied if the quota is exceeded. Specifications for waterlining of imported newsprint, while periodically suspended, are a potential non-tariff barrier.

South America -- This is the third largest market in terms of world trade. More than 5 percent of Canadian exports of newsprint is shipped to this market. Tariff rates range from free to substantially high levels (at one time a 145 percent tariff was applied to Chile). Access of Canadian newsprint to the South American market is seriously threatened, not only by the accelerating trend towards self-sufficiency in newsprint, but also by the fact that the Latin American Free Trade Area (LAFTA) favours newsprint produced by member countries. Additional non-tariff barriers such as waterlining specifications and foreign exchange regulations and controls protect their domestic newsprint industries.

Other Markets -- Expansion of trade with Japan is impeded by a 4.4 percent tariff levy. More importantly, however, consumption must be fully satisfied by domestic production before import licences are issued. This is partially a result of the close informal relationship that exists between the government and the business community in Japan and is a major non-tariff barrier affecting market access for Canadian newsprint.

Although newsprint enters Australia duty free, the present bilateral trade agreement between Australia and New Zealand which gives special preferences for newsprint shipments to Australia is a major factor limiting market access of Canadian newsprint.

Other Paper and Paperboards

Paper and paperboard producers are primarily oriented towards the domestic market. International trade in these products is frequently subject to significant tariff and non-tariff barriers. High Canadian tariffs have effectively reduced import competition for many of these products. However, from time to time during periods of slack markets, United States board has entered the Canadian market in a substantial way. Fine paper imports, for example, have ranged between 10 to 35 percent of the domestic market despite Canadian tariffs of 12 to 15 percent.

United States -- This market represents the industry's principal export market taking 50 percent of total exports. Tariff rates vary from free to 12 percent and are so structured that tariffs tend to be low on those products where the U.S. industry is already very competitive. The very high rates apply to the products where U.S. producers are least competitive and have the effect of greatly inhibiting imports of these products. Non-tariff barriers such as tariff reclassifications of paper grades and allegations of dumping are a major problem.

European Economic Community -- Canadian producers of other papers and board products face tariff rates ranging from 8 percent to 12 percent. The major non-tariff barrier restricting Canadian trade with the EEC is the preferential trade agreement between Finland, Sweden, Norway and the enlarged European Community. Canada's products face loss of parity of access to the market as a result of agreements with the Scandinavian countries.

Other Markets -- Due to high protective tariffs in Latin America, access will continue to be negligible. The development of the trading block in Latin America (LAFTA) further aggravates the problem.

Japan's tariffs, ranging from 8 to 16 percent for all other paper and paperboard products, will continue to restrict penetration of this market.

Further Manufactured Products

The further manufactured wood and converted paper products industries tend to be domestically oriented, often selling to very local markets. These industries are generally fragmented with many small companies, typified by high costs and short production runs. The relatively small size of Canadian plants in some of these industries does not provide the economies of scale to meet competition effectively from high volume U.S. producers. Canadian industry is protected by tariffs with rates which range from 0 to 20 percent. Rates of 15 to 20 percent are typical for further manufactured products such as prefabricated housing, millwork and pallets and 17 percent for most converted paper and board products. This high level of protection has strongly influenced industry organization, development and marketing in Canada.

Tariff rates in current and potential export markets range from free, for typically low value added products, to 37 percent for further fabricated products. Examples of tariffs on these products into the U.S. are 12 percent for prefabricated buildings and 8 percent for millwork. Major non-tariff measures for manufactured wood products include multiplicity of building codes and standards, product certification requirements, metric measurements, complex and costly distribution systems, and tariff quotas. In addition, shortage of foreign exchange is a significant constraint to trade in many developing countries. The converted paper and board industry is constrained more by competitive factors than specific non tariff measures. Tariffs to the U.S., the only practical export market, range between 8 and 20 percent for most converted products.

The Department of Industry, Trade and Commerce has placed emphasis on the upgrading of forest resources into further manufactured products in view of the advantages for employment and value added to the economy. Improved access through reduction of tariff and non-tariff measures would increase the potential for development of these sectors. While recognizing that tariff reductions under the MTN could lead to improved market access for some further manufactured products as well as other protected grades, they could also lead to significantly increased competition and hence the need for adjustment, including that for industry rationalization.

TABLE 90

TARIFFS ON SELECTED FOREST PRODUCTS*

| PRODUCT | CANADA | UNITED STATES | EEC | JAPAN |
|---|-----------------------------------|---------------------------------|--|-----------------------------------|
| Softwood lumber | Free | Free | 5% (dressed) | 10% (Spruce-Pine-Fir) |
| Softwood plywood | 15% | 20% | 13% (tariff-free quota of 400,000 M ³) | 15% |
| Softwood veneer | 8% average (range 7½-10%) | 5% | 7% | 15% |
| Particleboard | 15% | 10% | 13% | 20% |
| Builders' carpentry and joinery | 14% average (range 7½-17½%) | 8% average (range Free-17%) | 7% | 7½% |
| Pulp | Free | Free | Free | 5% ** |
| Newsprint | Free | Free | 7% (tariff-free quota of 1,500,000 metric tons) | 5½% ** |
| Other machine-made paper and board, in rolls and sheets | 12% average (range Free-20%) | 4½% average (range Free-16%) | 7% average (range 3-12%) | 14% average *** (range 10-20%) |

Source: Department of Industry, Trade and Commerce.

* Bound GATT rates, where specific duties are involved, these have been converted to 1974 ad valorem equivalents. Where average rates are given, these have been rounded to nearest half percentage point. It should also be noted that special concessions under GPT can reduce the tariff rate on imports of certain products from developing countries, e.g., hardwood plywood, clothespins.

** Statutory rates subject to modification.

*** Average includes several unbound items.

OUTLOOK TO 1990

This section provides estimates of annual long-term growth rates in Canadian production to 1990 for major products in the forest products group. The projections reflect not only the structural aspects and other competitive factors as described elsewhere in the paper but also general economic developments in North America and other world markets as well as the unique market conditions for specific products. Definitive forecasts are not possible, and the limitations and qualifications associated with any long-term growth estimates of industries as complex and dependent on so many independent factors as the forest products industry must be emphasized.

These projections are intended, however, to provide an indication of industry direction and a reflection of the basic problems associated with their development. They are also intended to encourage a greater emphasis on the longer term by those associated with the industry. Their importance to strategic considerations is considered paramount.

These projections rely primarily on the judgement and the combined views of economists, industrialists and planners. Numerous studies of supply/demand trends in forest products provided reference material and the basis for the estimates. Such studies include those by the Food and Agriculture Organization (FAO), the Economic Commission of Europe (ECE), the United States Forest Service (USFS), the Department of Fisheries and the Environment (DFE), the Department of Industry, Trade and Commerce (DITC) and private consultants such as F.L.C. Reed and Associates, Sundelin A.B. of Sweden and Jakko Poyry and Company of Finland.

Many of these studies have revised downward earlier indications of high growth demand. These downward revisions are due to structural changes in the world economy, lower expectations of growth in world GNP and per capita income, demographic factors, and the effects of rising prices on consumption, including conservation measures and product substitution.

While most of these studies relate solely to consumption, the projections in this section are for Canadian production and therefore include consideration of potential constraints to supply in Canada. For example, potential growth in world consumption of a product may be indicated as strong, but the Canadian industry's ability to supply, given its competitive strength and its terms of access vis-à-vis producers elsewhere in the world may preclude growth. A major consideration applying to all forest products is the cost and availability of timber in Canada compared with other supplying regions. These aspects are brought out more fully throughout this section and indeed throughout the review.

In Table 91 trend projections to 1990 are presented without reference to the timing of business cycles which are difficult to forecast in a meaningful way over the longer term.

A range of growth rates in production of major primary forest products is presented because of the general difficulties in making precise forecasts but also because of the current uncertainties affecting industrial production in Canada. These include instabilities in world and domestic economies, inflation, cyclical profits, extraordinarily high capital costs and difficult relations between labour and management. In some cases, the lower limits of the indicated ranges may be more realistic than the higher limits on the basis that the uncertainties and structural difficulties facing the industry will continue. On the other hand, economic developments favourable to the Canadian forest industry, such as the devalued Canadian dollar, could lead to faster growth rates. The high points of the ranges probably more closely relate to industry potential, and might be considered as targets. Success in achieving those targets would depend on whether economic factors are favourable, the forest industry addresses its longer term structural difficulties and government policies are conducive to stability and investment.

The projected growth rates apply to the period commencing from a 1973 to 1974 or 1973 to 1975 base average (considered fairly representative) to 1990. Estimated growth rates are also presented from the base period to 1980 and from 1981 to 1990 since it is anticipated that growth trends in some sectors will change during these different time periods and because, in some cases, developments in the latter periods will depend on those in the earlier years. For example, price changes, capacity increases, and market developments taking place in the pulp and paper sector over the next few years will significantly affect growth in ensuing years.

A summary explanation of the rationale supporting each product forecast follows Table 91. Each explanation includes, as appropriate, an overview of the market outlook by major region followed by an assessment of the Canadian industry's ability to supply these markets. The production forecasts are, in summary, based on an assessment of demand and any overriding supply factors pertaining to the particular product.

TABLE 91

CANADIAN PRODUCTION PROJECTED TO 1990

| Product | Actual Production | | Ann. Av.* 1973-75 | Actual Percentage Growth Rate | | Projected Percentage Annual Growth Rate | | | | Projected Volumes 1990 |
|---------------------|-----------------------------------|--------|----------------------|----------------------------------|-------------------------------|--|-------------------|-----------------|---------------------|------------------------------|
| | 1955 | 1965 | | 20 Yrs (1955 to 1973-5) | 10 Yrs (1965 to 1973-5) | 1973-5 to 1990 | 1973-5 to 1980 | 1981 to 1990 | | |
| Softwood Lumber | 7,546 (million bd. ft.) | 10,290 | 13,971 | 3.1 | 3.1 | 2.0 to 3.0 | 4.5 to 5.0 | 1.0 to 2.0 | 21,000 to 23,000 | |
| Softwood Plywood | 717 (million sq. ft. 3/8") | 1,620 | 2,257 | 5.9 | 3.4 | 2.0 to 3.5 | 5.5 to 6.5 | 1.5 to 2.5 | 3,500 to 3,900 | |
| Market Pulp | 2,438 (thousand short tons) | 4,288 | 6,956 | 5.4 | 5.0 | 2.5 to 3.5 | 2.5 | 3.5 | 10,300 to 12,100 | |
| Newsprint | 6,236 (thousand short tons) | 7,747 | 8,841 | 1.8 | 1.3 | 1.0 to 2.0 | 1.5 to 2.0 | 1.0 to 1.5 | 10,400 to 12,100 | |
| Other Paper | 1,804 (thousand short tons) | 3,036 | 4,821 | 5.0 | 4.7 | 2.5 to 4.0 | 3.0 | 3.5 | 7,200 to 9,000 | |

Source: Department of Industry, Trade and Commerce.

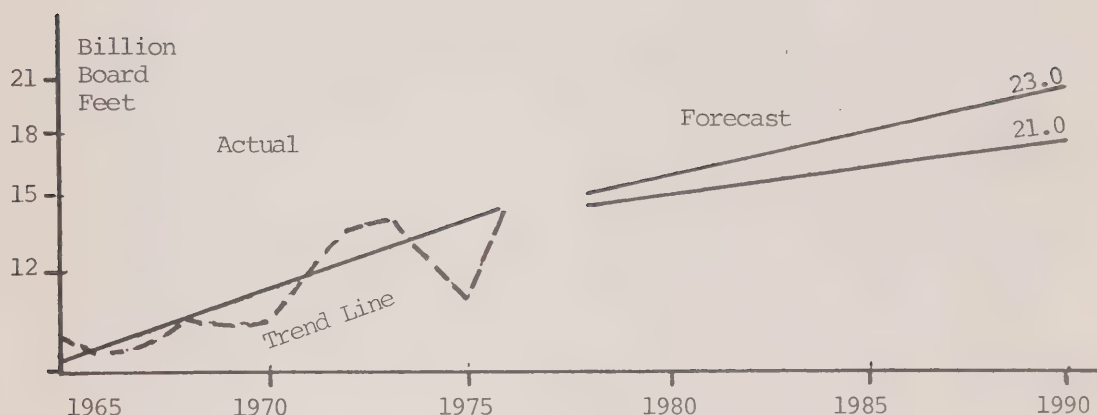
* Average of the period 1973 to 1975 for pulp and paper products is considered more representative than any single year in that period. For softwood lumber and plywood, average of 1973 and 1974 is considered most representative due to severely depressed 1975 production levels. Single year peculiarities in 1955 or 1965 may distort indicated growth trends in certain cases.

The sectors above are some of the major primary forest products and account for about 90 percent of shipments and employment of the total primary industry.

Primary Wood Products

Softwood Lumber

Actual vs Forecast Production



Canadian production of softwood lumber is forecast to increase over the longer term at rates slightly below historical averages, with even slower growth beyond 1980. In forecasting lumber production to 1990, the demand factors appear more significant in the earlier part of the period with wood supply constraints becoming increasingly important near the end of the period. Markets in North America, Western Europe and Japan currently account for over 90 percent of Canadian production.

Estimates by F.L.C. Reed for the department are that the annual growth rate of lumber consumption in the United States should be about 1.3 percent to the year 1990 based on indicated trends in housing as well as other end-use markets, such as non-residential construction and industrial uses, which are expected to grow significantly faster than housing. Growth in Canadian consumption will be slightly higher at 1.5 percent. Annual housing starts in North America are anticipated to decline in the 1980s based on demographic factors, and houses are expected to be smaller. Most of the lumber consumption increase is therefore forecast to take place by the early 1980s with growth levelling off in later years at an estimated average annual rate of less than 1 percent.

In Europe, lumber consumption growth rates after 1980 should be slightly higher than in North America (ECE forecasts exceed 1 percent yearly) due to the growing need for rehabilitation of the existing housing stock and a shift towards timber frame construction methods. Gaining official acceptance of Canadian codes and standards and greater recognition of Canadian construction grade lumber by the European trade will greatly expand the market opportunities for Canadian suppliers in Europe.

The Japanese market offers the greatest growth potential of any of the offshore markets. The Japanese economy is growth oriented and increased housing demand is anticipated. The above demand forecasts presuppose greater acceptance of Canadian grades and sizes and platform frame housing construction methods in the face of cultural rigidities. Other constraints include the complicated distribution channels for lumber in Japan, the 10 percent tariff on spruce/pine/fir finished lumber and competition from Japanese and U.S. sawmills.

Other offshore markets such as Australia and the Middle East offer potential gains, but they are much less significant in total volume.

Because of high energy requirements for non-wood materials, there is potential for lumber to regain its traditional share of markets lost to such materials as steel studs and to penetrate new markets. Advantages in the insulating characteristics of timber frame construction and in some cases labour costs will be a positive factor in those countries that do not have a timber frame housing tradition.

On the supply side, Canadian lumber capacity has increased significantly in the 1970's as a result of record levels of housing construction in North America in 1972 and 1973 and again in 1977 and 1978. New capacity continued to be installed even during the sharp downturn in market conditions in 1974 and 1975 because of the benefits of further integration with the pulp and paper sector, especially in Eastern Canada. This trend has been reinforced by provincial forest policies and availability of regional development incentive grants.

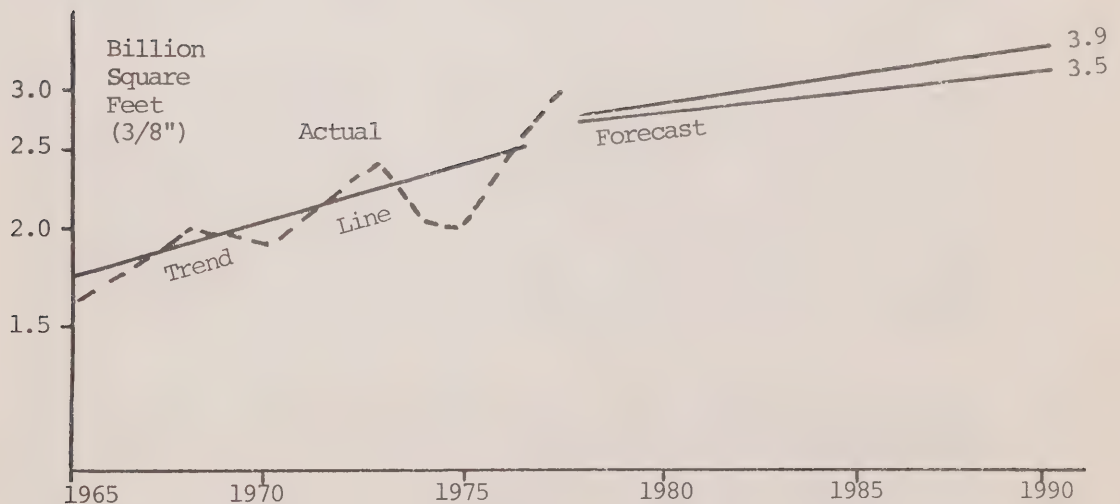
The Canadian industry, therefore, has a base of high capacity, particularly in the short and narrow sizes, and its ability to supply should not be a constraint to production in the short to medium term. Canadian lumber operations have been generally cost competitive with those in the United States, but this position has been eroded in recent years due to significant increases in the cost of all factor inputs. While there will likely be shifts in regional shares of production in the U.S., i.e., from the Pacific Northwest to the U.S. South, due to the availability of timber, the overall level of U.S. lumber production is not expected to increase significantly from current levels. Canadian lumber should therefore continue to maintain, if not increase, its share of this market. Future policies of the U.S. Forest Service, which controls a considerable proportion of U.S. timber supply, and the degree of influence of conservation groups in restricting the availability of public timber for commercial use present uncertain factors affecting the level of U.S. production and corresponding Canadian penetration of U.S. markets.

In Europe, Canadian construction grades of lumber compete directly with Scandinavian and Soviet lumber. While the former has reached limits of timber supply, the latter situation is unknown despite reports suggesting that the Western U.S.S.R. is overcutting. High transportation costs and unfamiliarity with Canadian grades and specifications limit the ability of Canadian mills to compete in the construction grades of lumber against more traditional suppliers. Moreover, the ability of Canadian lumber producers to provide the clear grades, which have traditionally represented a large portion of Canadian export to Western Europe, has reached its upper limit because of declining log quality. The above forecasts assume only some success in penetrating European markets due to these constraints.

Within Canada, B.C. is in an excellent position to supply offshore markets because of location, experience and highly developed material handling and transportation systems. The forecasts assume that most of the increase in eastern Canadian production will be sold in North America. The increased volumes produced in Eastern Canada and the potential of shipping lumber in combination with other forest products to reduce transport costs should favour some increased offshore shipping to Europe.

Softwood Plywood

Actual vs Forecast Production



Canadian production of softwood plywood is forecast to increase over the longer term at rates significantly below historical averages as the market for plywood matures. While demand factors are important, the competitive position of Canadian softwood plywood vis-à-vis other world producers and other substitute panel products is a major constraint to growth. The situation is described more fully below.

The longer-term potential for softwood plywood was viewed in the context of the total exterior panel product industry, for which consumption should continue to increase. Competition from other exterior panels such as waferboard will continue to reduce the demand for sheathing grades of softwood plywood because of the locational advantages of Canadian waferboard plants in relation to eastern Canadian markets and marginal cost advantages of waferboard producers.

The primary market for Canadian produced softwood plywood is domestic. Exports to Britain and other EEC countries were up sharply in 1977 and 1978 as Canada regained its share of these markets previously lost to U.S. plywood. Exports now represent the traditional 15 to 20 percent of total Canadian production. The United States market should continue to grow but is effectively closed to Canadian producers because of the lower cost position of the U.S. industry, particularly in the sanded grades, and the 20 percent tariff. Due to the potential for timber frame houses in Europe and Japan, consumption of panel products over the longer-term should increase in these markets. Despite this market growth, however, the longer term demand potential for Canadian plywood in offshore markets is offset by high costs in certain industry segments and problems arising from foreign building codes and product standards in many countries.

The bulk of Canada's softwood plywood production is in British Columbia with many of the older coast mills producing a full range of plywood products and the newer, more efficient mills in the B.C. Interior, and to a lesser extent eastern Canada, producing primarily sheathing grades. In general, the West Coast mills are well located for export but are not as cost efficient as those in the much larger U.S. industries. However, the sheathing mills in the B.C. Interior and east of the Rockies are fully competitive with U.S. producers and will continue not only to supply domestic markets but also to make further advances in offshore markets.

Penetration of U.S. plywood into Canada, which reached record levels in 1975 with close to 23 percent of the domestic market, has declined to almost negligible levels in 1977 and 1978 due to a more reasonable supply/demand balance in the U.S. and to increases in Canadian capacity of waferboard and sheathing grades of plywood. New capacity will likely be confined to sheathing grades through modernization of coastal facilities, new greenfield operations in the B.C. Interior and new waferboard and other composite panel plants east of the Rockies.

Pulp and Paper

When considering the longer-term demand outlook for paper grades and pulp, the traditional approach has been to rely primarily on the historical relationship between consumption and gross national product.

This approach was utilized in 1972 by a working group of the Federal Interdepartmental Committee on the Canadian Pulp and Paper industry. Using regression techniques and relying primarily on GNP as the independent variable and on GNP forecasts prepared by the FAO and ECE, this working group forecast consumption of the three paper product categories for major world regions. These growth rates, derived in 1972, are high by current standards but are presented in Table 92 so that they may be compared with more recent forecasts.

TABLE 92

Annual Percent Increase in Consumption, 1975 to 1985

| <u>Region</u> | <u>Newsprint</u> | <u>Printing-Writing</u> | <u>Industrial</u> | <u>Average</u> |
|----------------|------------------|-------------------------|-------------------|----------------|
| North America | 3.3 | 4.7 | 3.6 | 3.8 |
| Western Europe | 4.0 | 5.9 | 4.7 | 4.9 |
| Japan | 5.9 | 6.9 | 6.8 | 6.7 |
| Other | 5.8 | 6.8 | 6.6 | 6.6 |
| World | 4.3 | 5.8 | 5.0 | 5.1 |

Source: Department of Industry, Trade and Commerce

More recent studies reflect considerably lower rates of economic growth in major world economies than the GNP projections used above. They also place more emphasis on changing consumption patterns, the price effects of other products substituting for paper, lower quality papers substituting for higher quality papers, the effects of periodic or extended periods of paper shortages and changing consumer habits.

A. Sundelin, a respected European forest economist, forecast in October 1975 a less than 4 percent world growth in paper and board demand to 1990 compared with an actual 5.7 percent in the 1960s. The rates for North America, about 2.5 percent, and Western Europe about 3.5 percent, were lower than those in other world regions.

Projections of pulp and paper demand published by the FAO are often used by governments and industries in their planning. The Export Consultation on World Pulp and Paper Demand, Supply and Trade was held in Tunisia in 1977 under the auspices of the FAO. This consultation involved 88 senior executives from the pulp and paper industry and trade associations from 31 different countries and 16 representatives from national and international organizations including UN agencies. The main documents were published by the FAO in 1978 and the outlook contained therein reflects the downward adjustments referred to above. A summary of the outlook is set forth in Table 93.

The 1978 FAO report provides further insight into developments of the 1970's which affected future growth rates of paper consumption:

"However, with rapidly increasing capital costs, initiated from about the beginning of the decade, by relative capita scarcity, and more particularly by added investments for obligatory pollution control, intensified by rapidly escalating fuel costs and needs for energy savings, there was serious concern over profitability and the continuing establishment of adequate pulp and paper production capacity to meet future demand. A false scarcity attitude developed in 1973 and 1974, stocks were increased excessively and prices rose rapidly. This combination of events brought about some economies in paper use, notably an acceleration in the reduction in basis weight of newsprint. The strong recession of 1975, resulting from the oil crisis and consequent developments and which was the most extreme since the 1930's, was accompanied by a fall in consumption of paper, a reduction of stocks and a consequent marked decline in paper production."

TABLE 93

Annual Percentage Increase in Paper and Paperboard Consumption, 1975 to 1990

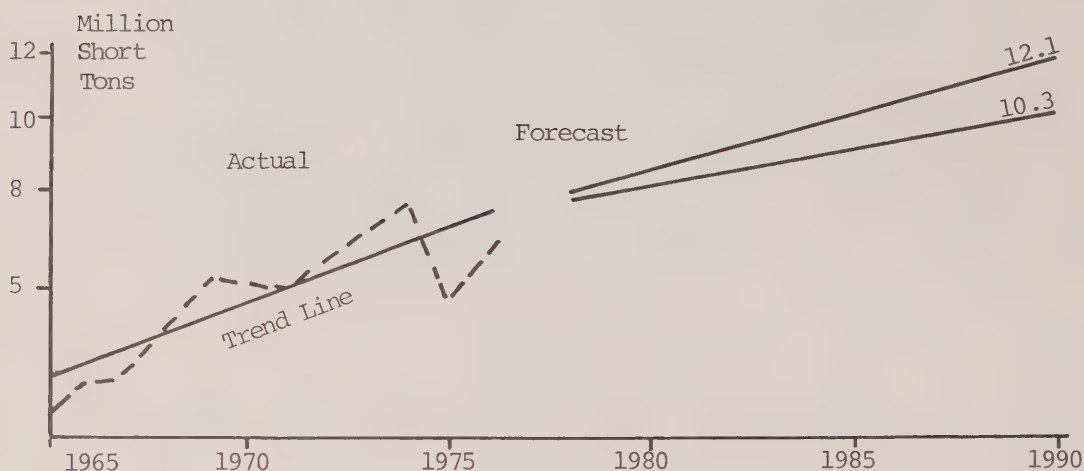
| Region | Newsprint | | | Printing Writing | | | Other Paper and Paperboard | | | Average | | |
|------------------------------|---------------------|------------------|------------------|---------------------|------------------|------------------|-------------------------------|------------------|------------------|---------------------|------------------|------------------|
| | '75 to '80 | '80 to '85 | '85 to '90 | '75 to '80 | '80 to '85 | '85 to '90 | '75 to '80 | '80 to '85 | '85 to '90 | '75 to '80 | '80 to '85 | '85 to '90 |
| North America | 1.8 | 1.4 | 1.2 | 3.4 | 3.0 | 2.8 | 3.2 | 3.2 | 3.0 | 3.0 | 2.9 | 2.7 |
| Western Europe | 1.2 | 2.1 | 1.9 | 2.9 | 2.8 | 2.4 | 3.8 | 3.5 | 2.9 | 3.2 | 3.1 | 2.6 |
| Japan | 3.8 | 5.1 | 4.3 | 6.1 | 5.1 | 4.3 | 4.6 | 5.0 | 4.3 | 4.8 | 5.0 | 4.3 |
| Latin America | 3.7 | 3.8 | 3.3 | 7.7 | 7.6 | 7.1 | 5.8 | 5.7 | 5.2 | 5.8 | 5.8 | 5.4 |
| Other Eastern Hemispheres | 3.0 | 3.2 | 3.3 | 6.1 | 6.1 | 5.8 | 6.3 | 5.9 | 5.5 | 5.7 | 5.6 | 5.3 |
| Centrally Planned | 4.7 | 4.2 | 4.0 | 4.6 | 4.4 | 3.0 | 5.1 | 5.0 | 4.5 | 4.9 | 5.8 | 4.2 |
| WORLD | 2.3 | 2.6 | 2.4 | 3.9 | 3.7 | 3.3 | 4.1 | 4.0 | 3.7 | 3.8 | 3.7 | 3.4 |
| | <u>1975 to 1990</u> | | | <u>1975 to 1990</u> | | | <u>1975 to 1990</u> | | | <u>1975 to 1990</u> | | |
| | 2.4 | | | 3.7 | | | 3.9 | | | 3.7 | | |
| | <u>1960 to 1975</u> | | | <u>1960 to 1975</u> | | | <u>1960 to 1975</u> | | | <u>1960 to 1975</u> | | |
| | | | | 6.0 | | | 4.9 | | | 4.9 | | |

Source: World Pulp and Paper Demand, Food and Agriculture Organization, 1978.

The consumption forecasts previously referred to are not constrained by supply and competitive limitations which in Canada could reduce production below growth rates in world demand depending on product. The combination of product demand expectations and the industry's supply and competitive capabilities is amplified in the following section by product sector.

Market Pulp

Actual vs Forecast Production



Canadian production of market pulp is forecast to increase over the longer term at rates below long-term historical averages, although the relatively slow, current rate of growth should accelerate after 1980. Although demand factors predominate, certain aspects related to supply will become increasingly critical over the longer term.

Pulp growth rates are heavily influenced by paper growth rates and any adverse trends in newsprint and certain other paper grades will affect the demand for pulp. There is however, some distortion in the relationships between paper and pulp demand within world regions because of international trade in papers. Furthermore, growth in wood pulp demand is anticipated to be less than that for paper due to the greater use of recycled wood fibre and non-wood fibres such as bagasse.

Long-term market demand will come from major market regions with established paper manufacturing facilities and markets. Over 80 percent of Canada's market pulp is sulphate and major markets are the United States, Europe and Japan, with roughly 55 percent, 25 percent and 10 percent respectively of Canadian exports. The developing regions will become increasingly self-sufficient, and indeed some countries such as Brazil should eventually become, by all reports, net exporters.

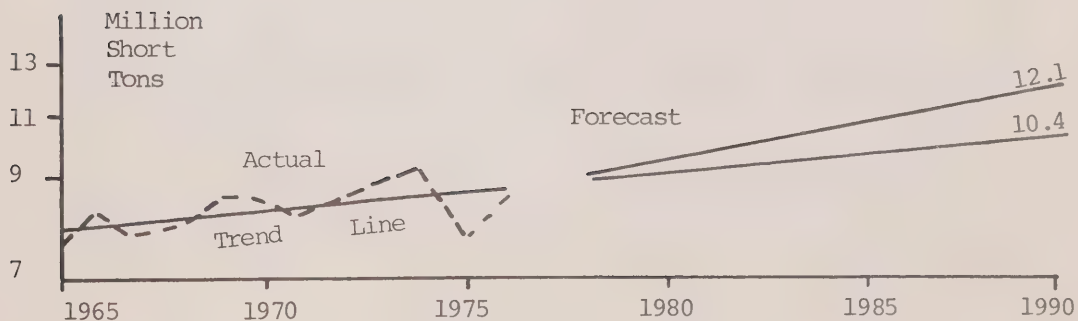
Nonetheless, as softwood timber reserves become increasingly scarce throughout the world, there should be a growing need for Canadian supply of market pulp. This is mostly northern bleached softwood kraft, and except for the U.S.S.R. and the United States, is limited in supply outside of Canada.

There are mitigating factors. Shortages of supply could give rise to technical developments and increase the trend to higher yielding mechanical, thermo mechanical, and high yield chemical grades despite higher energy requirements. Secondary fibre and bleached hardwood sulphate pulp are competitive threats to Canadian pulp producers. As a result, growth of demand in paper-producing regions for bleached softwood kraft could be adversely affected, particularly if paper making technology or consumer requirements for high grade papers change significantly. Notwithstanding these concerns, a significant part of the demand growth to 1990 in market pulp should be for bleached softwood kraft.

Canadian mills are large scale, capital intensive and can be price competitive in world markets despite comparatively high wood costs. Much of the capacity in B.C. is new and this accounts for the high rate of growth in production of Canadian market pulp over the last 15 years. New capacity increase could come from across Canada. B.C. in particular offers longer term advantages for expansion in the areas of fibre supply and wood costs. On balance, Canadian production of market pulp is expected to increase 2.5 to 3.5 percent annually to 1990.

Newsprint

Actual vs Forecast Production



The slow growth rates experienced by the Canadian newsprint industry are expected to continue to 1990. Both the demand factors and the overall cost competitive position of the industry are important determinants of future Canadian production volumes.

Demand for newsprint is subject to competition from media other than newspapers, conservation measures initiated by publishers to counter increases in price (although these have perhaps run their course), postal rates, technological changes in printing, and shifts in consumer habits and population growth. The effect of these factors may be offset somewhat by a trend towards acceptance of newsprint in place of higher grades of printing and writing papers as the price of all papers increases.

About 80 percent of Canada's newsprint shipments are to the North American market. The range of long-term consumption forecasts for the North American market reflects the uncertainty of forecasting newsprint demand. Projections are:

| | (percent) |
|----------------------------|-----------|
| FAO (1972) | 2.3 |
| ITC (1973) | 3.3 |
| ITC (1976) | 2.0 |
| Jones for ITC (1975) | 2.3 |
| Poyry (1975) | 1.2 |
| ADL (1975) | 2.1 |
| A. Sundelin (1974) | 0.9 |
| A. Sundelin (1975) | 0.6 |
| F.L.C. Reed for ITC (1976) | 1.0 |
| FAO (1978) | 1.3 |

In Europe, long-term demand is anticipated to grow slightly faster than in North America with a growth rate of more than 1 percent but slower than in the East Bloc and developing countries where growth rates should be as high as 3 to 5 percent. Strong demand for newsprint is also anticipated in the Japanese market. Overall world newsprint demand should grow at about 2.5 percent per annum.

Newsprint consumption in the developed regions of the world will grow at a much slower rate compared to the rest of the world. This will result in the developed market economies consuming 72 percent of the world's newsprint in 1990, down significantly from 77 percent in 1975.

On the supply side, however, Canada's share of the world newsprint market is expected to decrease as new, more profitable production units in other parts of the world come on stream. The U.S. South industry has shown rapid and consistent growth trends in capacity and has eroded Canada's share of the large U.S. market from over 80 percent in 1950 to the low 60 percent range in recent years. This trend is expected to continue over the longer term.

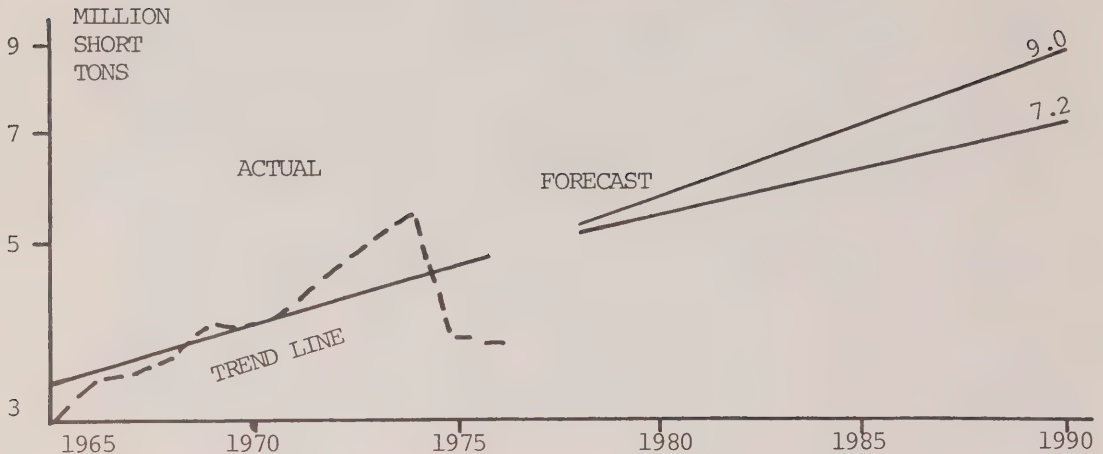
Newsprint from Scandinavian producers will continue to supply most of the incremental demand in European markets for at least 5 to 10 years and spot tonnage in the Middle East and Africa. These latter markets, however, do represent some opportunity for Canadian exports. Beyond that, many developing regions have the potential to be self-sufficient, which would adversely affect Canadian shipments to these regions. Access to the East Bloc countries and China will be limited for some time.

Canadian supply to the Japanese market is difficult to assess and will depend on the availability of imported raw material to the Japanese newsprint industry and on Japanese government decisions. New Japanese newsprint mills are anticipated, and technology leading to the use of other species could be a factor.

An assessment of a variety of world supply scenarios leads to the conclusion that Canadian production will increase more slowly than world demand and that Canadian exports will continue to rely heavily on the U.S. market. New Canadian capacity is limited somewhat by prohibitive capital costs for new facilities, high wood and manufacturing cost structures, and unstable returns. Long term capacity increase will most likely be restricted to the upgrading of existing facilities rather than new mills. Technological advances in the use of exotic wood species, recycled wood fibres and non-wood fibres could also have a negative impact on Canadian capacity increases.

On balance, Canadian newsprint production is anticipated to increase by 1 to 2 percent yearly. Regionally, the bulk of the increased production from modernization should come from Quebec and Ontario where 80 percent of existing capacity is located.

Other Paper and Paperboard
Actual vs Forecast Production



Canadian production of paperboard and paper other than newsprint is expected to grow at rates below those experienced in the 1950s and 1960s but above those experienced in the latter part of the 1970s. The key factors are demand in the domestic market, which is closely related to the growth in the Canadian economy, and the Canadian industry's ability to maintain this market. The opportunities for export are limited under existing circumstances as set out in the following paragraphs.

The world growth rate to 1990 in consumption for papers and board other than newsprint is expected to be less than 4 percent. As with newsprint demand, growth rates in the developing countries will exceed those of the developed regions, resulting in a marked increase in their share of total world consumption.

Projections for demand growth in packaging paper and paperboard, which account for about 50 percent of total other paper and board, are between 3 and 4 percent in Western Europe, close to 3 percent in North America and between 5 and 6 percent in developing countries. The key export opportunities for selected packaging paper and paperboard grades, such as kraft linerboard and possibly sack kraft paper, are to the EEC and to a lesser degree to the developing countries. The potential in the EEC is due to an anticipated net deficit, but there are constraints such as U.S. and Scandinavian competition and the 8 percent tariff disadvantage vis-à-vis Scandinavia.

The United States with its forest resources, efficient production facilities, and with a continuing direction towards total self-sufficiency in packaging paper and paperboard products, both consumer and industrial, forces Canada into a position of marginal supplier to the U.S. market. In addition, United States producers should continue to be Canada's major competitor in world markets, especially for kraft linerboard.

Japan is the world's second largest producer of paper and paperboard products with virtual self-sufficiency in these products and this situation will likely continue, providing a raw material supply is maintained. This precludes major export opportunities for Canadian producers.

Recent projections for North American demand growth rates for printing and writing papers, which account for about 20 percent of Canadian shipments of other paper and paperboard, are as follows:

| | (percent) |
|-----------------|-----------|
| FAO (1972) | 4.1 |
| ITC (1973) | 4.9 |
| Jones (1975) | 4.3 |
| Poyry (1975) | 4.1 |
| Sundelin (1975) | 3.0 |
| FAO (1978) | 3.0 |

The Canadian producers of these papers supply the domestic market. Although there are some exports, primarily to the U.S. and only in certain grades, significant export growth is not assumed in forecasts of Canadian production because of the larger scale, more efficient American producers as well as tariff barriers.

The EEC fine paper producers should continue to be major suppliers to their own market, with the Scandinavians continuing as the major incremental suppliers. An additional constraint for increasing market penetration in the EEC is that the Canadian tariff disadvantage by 1984 vis-à-vis Scandinavia will be 12 percent.

Japan is a net exporter of printing and writing papers and it is expected that during the 1980s domestic producers will continue to dominate the market.

Production of other paper and paperboard grades such as kraft paper (excluding sack kraft), sanitary tissue and box board grades is again for domestic supply, and no changes are foreseen.

On balance, Canadian producers of paper and board grades other than newsprint will, with few exceptions, continue to rely on the growth of the domestic market. It is conceivable that some existing export tonnage could be shifted back to this market. Import levels could increase marginally despite tariffs and will depend on the competitive position of Canadian producers compared with those in the United States. On balance, growth in production to 1990 should average between 2.5 and 4.0 percent with a greater probability for the lower end of the range.

Regionally, the bulk of the grades are located in Eastern Canada but growth in production could take place in any of Canada's forest regions.

Implications

Considering the size of the forest industry, its multiplier effect, and its export level, the implications of different growth paths of the forest industry on the Canadian economy (employment, balance of payments and GNP) are significant. Using the Canadian EXPLOR model, a decline in the assumed growth rate by about 3 percentage points in the pulp and paper sector alone results in differences of over \$3 billion (constant dollars) in pulp and paper exports annually by 1990 and close to \$9 billion (constant dollars) in the current account balance for the entire economy. The impact of reduced forestry industry development on the Canadian economy as a whole would be significant.

A longer term perspective is essential for proper considerations of policy but the difficulties in forecasting cannot be minimized. There is a need for continuing and rigorous examination of world markets and Canadian production potential under varying assumptions. Such analysis should be extended to other forest products and might lead to the setting of growth targets.

The continuing work on supply/demand trends should include a detailed investigation of the impact of growth on employment, capital requirements and wood fibre requirements. Preliminary estimates are set out in the following paragraphs.

While projection of existing employment to production ratios would indicate over 25,000 new jobs by 1990, actual production growth over the last 15 years has been accompanied, in most sectors, by a nominal increase in employment as equipment has continued to substitute for labour. This trend will likely continue so that employment generated by production increases in the industry will likely fall well below this figure.

If capacity requirements to support the production forecast to 1990 are entirely in the form of new facilities producing at 90 percent of capacity, the capital costs in 1976 constant dollars would be close to \$10 billion, with most of this for pulp, paper and board facilities. These assumptions, however, are tenuous. For example, much of the increased industry capacity will come from modernization and upgrading of existing facilities at a substantially lower capital cost per unit of production, and capital requirements, therefore, will be proportionately less.

Preliminary calculations of fibre requirements based on the upper range of the production forecasts for 1990 indicate an additional annual need in that year of 30 to 35 million cunits. This comprises 23 million cunits, including 8 million cunits of wood residues from lumber and plywood operations, for pulp and paper and 18 million cunits for lumber and plywood.

The additional annual fibre requirements by 1990 of 30 to 35 million cunits approximates the current excess of Canada's annual allowable cut over actual cut. The limitations of wood fibre for expansion will be particularly serious in the developed forest regions where the infrastructures are established and the economics of operation are most favourable. While the wood fibre limitations raise serious implications for Canada's forest industrial development, a number of assumptions such as the potential for further utilization, potential for increased yield through intensive forest management, and the validity of existing inventories and annual allowable cut calculations need to be examined in more detail for meaningful forecasts.

APPENDIX I

FEDERAL SUPPORT PROGRAMS

There are many industrial development and support programs in operation, some of which are unique to the forest products sector while others are applicable to all Canadian manufacturing industry or to all businesses. A listing of programs applicable to the sector follows.

Enterprise Development Program (EDP)

The programs of the Department of Industry, Trade and Commerce underwent a major restructuring at the beginning of fiscal year 1977-78. At that time, programs which had been of benefit to the forest industries were replaced by the new Enterprise Development Program (EDP). Four of the former programs are:

- Program for the Advancement of Industrial Technology (PAIT)
- Program to Enhance Productivity (PEP)
- Industrial Research and Development Incentives Act (IRDIA)
- General Adjustment Assistance Program (GAAP)

Substantial support was extended to the sector during the lifetime of these four programs. PAIT and PEP, together with IRDIA, which was discontinued at the end of 1975, were grant programs, whereas GAAP assistance took the form primarily of loan insurance. Altogether, in grants and insured loans, these programs extended almost \$50 million to the forest industries up to the time they were superseded by EDP.

The Department's new program combined the basic features of these earlier programs to provide more effective delivery and support to industry. The two principal elements of industrial innovation assistance and adjustment assistance are retained but in a more flexible and co-ordinated package. The focus for assistance has been shifted towards smaller and medium-sized businesses, especially those prepared to undertake relatively high-risk but potentially viable projects. The emphasis generally has become one where the Enterprise Development Boards (including Ottawa-based and regional boards), which administer the program, consider all the attributes of a firm and its requirements rather than just the support of a specific project.

Two other important criteria for eligibility are (1) for loans and loan insurance, the firm must be unable to obtain financing on reasonable terms, and (2) for other forms of assistance, the project must represent a significant burden on the firm's financial resources. In 1977-78, which was the first year of operation of EDP, support to the forest industry amounted to \$5.4 million.

Program for Export Market Development (PEMD)

PEMD was instituted in June 1971 and is administered by the Department of Industry, Trade and Commerce. The aim of the program is to develop and increase the export of Canadian goods and services by sharing with the business community the financial risks of entering new foreign markets. The program is in five sections covering:

- (i) participation in capital projects abroad;
- (ii) market identification and marketing adjustment;
- (iii) participation in selected trade fairs;
- (iv) invitations to incoming foreign buyers;
- (v) formation of export consortia.

From 1971 to the end of fiscal year 1977-78, support to the forest industry under the PEMD program amounted to approximately \$650,000.

Co-operative Overseas Marketing Development Program (COMDP)

COMDP was initiated in 1971 and renewed in 1976 for a further five years. The program is jointly funded by the Department of Industry, Trade and Commerce, the British Columbia Ministry of Economic Development, and the Council of Forest Industries of British Columbia (COFI) and is designed to create a climate of acceptance for long-term penetration of Canadian softwood lumber, plywood, and other wood products in a number of promising offshore markets. Under the general direction of a steering committee representing the three parties, the operational side of the COMDP is the responsibility of the Council of Forest Industries of British Columbia. Federal contributions during the first five-year program were \$3.2 million, and from 1976 to 1980 are projected to total about \$5.2 million.

Industrial Research Assistance Program (IRAP)

IRAP was established in 1962. The aim of the program is to improve the quality and quantity of industrial research in Canada, with particular emphasis on technical merit. Costs of approved projects are shared with the applicants on an approximately equal basis. The program is administered by the National Research Council. Disbursements to the forest products sector totalled \$13.8 million between 1967 and the end of March, 1978.

Co-operative Pollution Abatement Research (CPAR)

CPAR was established in 1970, in co-operation with the pulp and paper industry, to develop improved technology for the reduction of air and water pollution from pulp and paper operations. Funds are provided for approved pollution abatement research projects. Payments under the program to the industry, from inception to the end of March, 1978, totalled \$8.3 million. This program will be discontinued as of April 1, 1979.

Demonstration of Pollution Abatement Technology (DPAT)

DPAT began in 1975. It is designed to stimulate the development and demonstration of new technology for the abatement of pollution. Up to 50 percent of the total capital and operating costs for large-scale pilot plants or prototype operations can be covered under the program, which is administered by the Environmental Protection Service. Cumulative disbursements to the sector to the end of March, 1978 amounted to \$2.8 million. The program is also to be discontinued as of April 1, 1979.

Energy from the Forest (ENFOR)

ENFOR, which was announced in July 1978, is a program supporting the research, development and demonstration of new methods and technology aimed at substituting forest biomass for non-renewable fuels and chemical raw materials. The program arrangements are that ENFOR normally provides 100 percent funding of the costs of approved work, and the results become the property of the government and are distributed to the public. The program will run until the end of fiscal year 1983-4, with total funding of \$30 million. Program administration is the responsibility of the Canadian Forestry Service.

Forest Industry Renewable Energy (FIRE)

The objective of FIRE program is to provide an incentive to industry to utilize waste forest biomass as a source of energy. For approved projects the federal government will make progress payments of up to 20 percent of the capital costs of the equipment. The program was announced in July 1978 and continues until end-March 1984, with a total of some \$103 million being made available during this period. Funding and administration are provided by the Department of Energy, Mines and Resources.

Regional Development Incentives Act (RDIA)

RDIA came into force in 1969. The aim of the program is to encourage investment in the designated regions and special areas of Canada in support of the establishment, modernization or expansion of manufacturing and other types of facilities. The incentives may be in the form of grants or loan guarantees. To end-March 1978, the program has since its inception led to grants to the forest-based industries of \$652.9 million, with a direct job-creating effect of 22,830 persons. The program is administered by the Department of Regional Economic Expansion.

General Development Agreement (GDA)*

The federal government has signed 10-year GDA's with every province except Prince Edward Island. These agreements provide the framework for combined federal-provincial action to promote economic development. The overall purpose of the GDA is then implemented by an ad hoc subsidiary agreement. Although a number of subsidiary agreements have contained developmental implications for the forest industries, sub-agreements with five provinces have been specifically directed to the sector. The commitment on the part of the Department of Regional Economic Expansion, the lead department at the federal level, is for \$264 million, as of November 1978, with other funds being provided by other federal departments and the province concerned.

Canada Manpower Consultative Service (CMCS)

CMCS was established in June, 1963. The program offers incentives for manpower assessment and mobility by helping to plan employment changes for workers affected by technological and other industrial changes. The objective is to encourage labour and management to plan in advance any plant or company adjustments required on account of these changes. Any employer who participates in the program is entitled to receive up to 50 percent of the cost incurred in the assessment of the manpower effects of industrial changes and in development of private plans for manpower adjustment. From 1975 to 1978, 119 Manpower Consultative Agreements had been entered into in the forest products sector, directly or indirectly affecting 127,000 workers. The program is administered by the Department of Manpower and Immigration.

Canada Manpower Industrial Training Program (CMITP)

Canada Manpower Training Program (CMTP)

CMITP originated in 1967. The program is designed to provide employers with financial and technical assistance to train their own employees. Employers are reimbursed for a portion of direct training costs and trainees' wages.

CMTP works in a similar fashion, except that instead of the training function being performed in-house, the Department of Manpower and Immigration purchases training from vocational centres, community colleges and other institutions on behalf of clients referred to training by Canada Manpower Centres. No cumulative figures are available but in 1974-75, 4,134 persons received training under the two programs in forest industry occupations.

* In February 1979, the federal government announced a plan to provide an estimated \$235 million over a five to seven year period for a federal/provincial cost shared program of incentive grants. This program provides up to 25 percent of capital costs for plant modernization projects in the pulp and paper industry, with particular emphasis on pollution abatement. The federal government also announced an increase in federal funds to provincial governments for forest resource management and development.

Export Development Corporation (EDC)

EDC is a crown corporation originally established in 1946, whose function is to facilitate and develop Canadian exports of goods and services by means of the provision of insurance, guarantees, loans and other financial facilities. The corporation will (i) insure Canadian firms against non-payment for the sale of Canadian goods abroad, (ii) guarantee financial institutions against loss when they become involved in export business by either financing the Canadian supplier or the foreign buyer. From 1946 to 1975, export shipments of forest products to the value of \$1.9 billion have been insured by the corporation.

APPENDIX II

REFERENCES FOR OUTLOOK

The section of the review which covers the "Outlook to 1990" aroused considerable interest among those to whom the document was circulated. The rates of growth indicated in the outlook have important implications for the future of the forest-based industries, for the suppliers of labour, capital and materials, and for the balance of payments accounts. The growth rates are also considerably lower, in most cases, than were ranges of rates proposed in a number of studies prepared in the earlier years of the decade.

For these reasons, and in response to a number of requests, the attached bibliography of sources consulted during the development of the outlook has been prepared. The studies listed have been arranged in the following sequence: (a) governmental, (b) international agencies, (c) the private sector. In addition, discussions were held with staffs of foreign and provincial governments, international agencies and private consultants to assess the most current thinking on prospects for the sector. Certain other studies were consulted which were prepared or obtained in confidence and they are in addition to the publicly available documents listed in this appendix.

Government

Canada's Reserve Timber Supply, Reed for Industry, Trade and Commerce, Ottawa, 1974.

Canadian Market Potential for Industrial Particleboard, and Particleboard Products, Columbia Engineering for Industry, Trade and Commerce, Ottawa, 1975.

World Wood Fibre Supplies and Canadian Pulp and Paper Prospects to 1990, Jones for Industry, Trade and Commerce, Ottawa, 1975.

Canada's Consumption of Forest Products, Manning, Canadian Forestry Service, Ottawa, 1970.

Forest Resources and Utilization in Canada to the Year 2000, Manning and Grinnell, Canadian Forestry Service, Ottawa, 1971.

Consumption Projections for Paper 1970-1980, Udell for American Newspaper Publishers Association, New York, 1971.

Evaluation of Global Forest Resources and Markets for Forest Products -- Analysis of Potential Forest Products in British Columbia, Jaako Poyry & Co. for British Columbia Forest Service, Helsinki, 1975.

The Outlook for Timber in the United States, United States Forest Service, Washington, D.C., 1973.

The Nation's Renewable Resources, United States Forest Service, Washington, D.C., August, 1975.

Long Range Prospect Regarding Demand and Supply of Import Forest Products, Ministry of Agriculture and Forestry, Tokyo, 1973.

International Agencies

Outlook for Pulp and Paper Consumption, Production and Trade to 1985, FAO Advisory Committee on Pulp and Paper, Rome, March 1972.

Assessment of Pulp and Paper Demand and Supply Trends 1975-79, FAO Rome, November 1975.

FAO Survey of Pulp and Paper Capacities 1975-1980, Rome, 1975.

Study of Timber Trends and Prospects in the ECE Regions 1950-2000, Preliminary draft by Timber Committee of Economic Commission for Europe, Geneva, 1975.

World Pulp and Paper Demand, Supply and Trade. Volumes I and II, FAO, 1978.

Private Sector

Canada's Forest Resource and Forest Products Potentials, Council of Forest Industries of British Columbia, Washington, D.C., 1972.

Canadian Pulp and Paper Industry, Threats and Opportunities 1980-1990, Paprican, Pointe Claire, Quebec, June 1975.

Outlook for Newsprint Consumption. Address by D.G. Tildesley, C.J. Hodgson, Richardson, to newspaper publishing executives, May, 1976.

Future Newsprint Demand 1970-1980, Udell for American Newspaper Publishers Association, New York 1971.

Future Alternatives in the Global Supply of Pulp and Paper. Presentation by Jaako Poyry and Co. to Second World Pulp and Paper Industries Conference, Helsinki 1975.

World Paper and Board, Predicasts Inc., Cleveland, Ohio 1975.

Investment Outlook and Related Federal Policies for the Paper Industries, 1976-1985, Stanford Research Institute 1976.

APPENDIX III

CONSULTATIVE COMMITTEES

The reference document was developed in consultation, both formal and informal, with a number of representatives of industry and government. The purposes of these consultations were many, but may be summed up as follows:

- (a) To assist the government in obtaining a better and more current understanding of the sector.
- (b) To supply information and expertise in specialized facets of the situation confronting the sector.
- (c) To consult on the development of priorities and policy implications for the sector.
- (d) To ascertain the reactions of business and government to the perceptions and analyses of the forest products sector, as expressed in the report.

There are three formally constituted consultative committees which have operated during the development of the present review of the forest industries. A brief description of these committees' terms of reference follows, together with a list of the membership. The three committees are:

Inter-Departmental Committee for the Review of the Forest Products Industries

This committee was originally established in 1971, when its purview extended only to the pulp and paper industry. Its purpose is to provide a focus for the perspectives of the federal departments concerned in their dealings with the forest industries. Its federal membership at time of consultation was as follows:

E.J. Ward
Director, Forest Products
Department of Industry
Trade and Commerce

V. Johnson
Director
Labour Data Branch
Department of Labour

L.J. Britt
Senior Industrial Specialist
Manpower Employer Services Branch
Department of Manpower and
Immigration

B. Mercer
Assistant Director
Economic Development Division
Finance Department

Dr. R. Bouchier
General Director
Environmental Management
Canadian Forestry Service
Environment Canada

J.M. Wright
Social Council Secretariat
Privy Council Office

G. Whyte
Senior Policy Adviser
Western Region
Ministry of Transport

J.K. Barker,
Bureau of Competition Policy
Department of Consumer and
Corporate Affairs

J.R. Millar
Director General
Analysis and Liaison Branch
Department of Regional Economic
Expansion

Forest Industry Development Committee (FIDC)

This federal-provincial committee was established in 1974. Its aims are: (1) to encourage the orderly growth of a strong and internationally competitive forest industry, (2) to promote a high degree of co-operation among jurisdictions, (3) to obtain the views of the private sector.

The FIDC assumed the responsibility for federal-provincial consultation during the preparation of the present industry review. Membership is from the departments of the federal government as shown above and from all provinces. The provincial representatives at the time of consultation were:

A.J. Herridge
Assistant Deputy Minister
Resources and Recreation
Ministry of Natural Resources
Toronto, Ontario
(Alternate: D. Drysdale
Director, Timber Sales Branch)

L. Lacasse
Directeur
Direction des produits de bois
Ministère de l'Industrie et du
Commerce
Québec, Québec

A.E. Starke
Technology Branch
Ministry of Industry and Tourism
Toronto, Ontario

J.M. Pouliot
Directeur du service de la planification sectorielle
Ministère des terres et forêts
Québec, Québec

R. McCullough
Director
Resource Utilization Division
Department of Commerce and Development
Fredericton, New Brunswick

R.A. Redmond
Director
Forest Management Branch
Department of Natural Resources
Fredericton, New Brunswick.

J. Meredith
Associate Deputy Minister
Department of Business and Economic Development
Victoria, British Columbia
(Alternate: H.W. Kee
Executive Director of Research and Analysis)

R. Thomas
Manager
B.C. Forestry Service
Department of Forests
Victoria, British Columbia

F.W. McDougall
Assistant Deputy Minister
Alberta Forest Service
Department of Energy and Natural Resources
Edmonton, Alberta

J.D. Smith
Assistant Co-ordinator of Lands and Forests
Halifax, Nova Scotia

E.J. Dickie
Supervisor
Natural Resource Industries
Department of Development
Halifax, Nova Scotia

L. Gravelines
Economic Research Analyst
Planning Branch
Department of Renewable Resources and Transportation Services
Winnipeg, Manitoba

M.T. Little
Wood Products Specialist
Forestry Branch
Department of Tourism and Renewable Resources
Prince Albert, Saskatchewan

G. Put
Head, Construction and Renewable Resource Section
Industry Development Branch
Department of Industry and Commerce
Regina Saskatchewan.

T.W. Strickland
Director
Industrial Supervision
Department of Industrial Development
St. John's, Newfoundland

J.A. Brennan
Assistant Deputy Minister, Forestry
Department of Forestry and Agriculture
St. John's, Newfoundland
(Alternate: W.L. Johnson
Director of Forest Management)

E.J. White
Director of Forest Products
Business Development and
Tourism
St. John, New Brunswick

I. Millar
Assistant Director of Forestry
Forest Services Branch
Department of Agriculture and
Forestry
Charlottetown, Prince Edward Island

W.D. Jackson
Senior Consultant
Project Development Branch
Department of Industry and
Commerce
Winnipeg, Manitoba.

Forest Industry Consultative Committee (FICC)

The FICC began operations in March 1976. The aim of the Committee is to provide a more systematic and structured framework for effective consultation with business, and to assist the government in gaining a better understanding of the performance of the sector. As one of its more immediate tasks, the FICC functioned in an advisory and consultative capacity on the development of priorities and policy implications for the sector. Non-governmental membership at time of consultation consisted of these 12 senior executives of the forest industries:

W.P. Caine
President
Commonwealth Plywood
Ste-Thérèse, Québec

Michel Perron
President
J.H. Normick Inc.
La Sarre, Cté Abitibi Ouest, Québec

Normand Désourdy
Vice-Président
Entreprises Désourdy Inc.
St-Jean, Québec

Ian McGibbon,
Vice-President of Corporate
Development
Abitibi Paper Co. Ltd.
Toronto, Ontario

J.R. Forrest
Group Vice-President
Forestry and Building
Materials
MacMillan Bloedel Limited
Vancouver, B.C.

D.A. Saunders
Chairman and Chief Executive Officer
Forest Industrial Relations and Pulp
and Paper Industrial Relations Bureau
Vancouver, B.C.

Dr. Pierre R. Gendron
President
Pulp and Paper Research
Association of Canada
Pointe Claire, Québec

John Scarth
President
The E.B. Eddy Co. Limited
Ottawa, Ontario.

J.K. Irving
President
Irving Pulp and Paper Limited
St. John, New Brunswick

C.P. Loewen
President
Loewen Millwork Limited
Steinbach, Manitoba

R.W. Stewart
President
Lakeland Mills,
Prince George, B.C.

E.A. Thompson,
Executive Vice-President, Packaging
Consolidated-Bathurst Limited
Montréal, Québec

APPENDIX IV

FOREST PRODUCTS GROUP

RESOURCE INDUSTRIES BRANCH

DEPARTMENT OF INDUSTRY, TRADE AND COMMERCE

Director: R.W. Ross

Primary Wood Products Division

Chief: E.L. Kelly
Officers: B. Kerr
A.E. Sudbury
W.A. Calow
A.P. Selin
M.J. Monaghan
N. Barber

Manufactured Wood Products Division

Chief: C.J. Copeland
Officers: E.E. Buswell
W.D. Wardle
J.T. Melnyk

Pulp and Paper Division

Chief: K. Vandervan
Assistant Chief: D.T. Roy
Officers: L. Gagnon
D.W. Fair
J.W. Hall
D.H. Macgregor
F.B. Johnson

Research and Planning Division

Officers: J. Skeggs
K. Montgomery

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